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THE

DENTAL COSMOS:

A

MONTHLY RECORD OF DENTAL SCIENCE.

Devoted to the Interests of the Profession.

EDITED BY

J. H. McQUILLEN, M.D., D.D.S.
GEO. J. ZIEGLER, M.D.

Observe, Compare, Reflect, Record.

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ORIGINAL COMMUNICATIONS.

PERIODONTITIS—ITS CAUSES AND TREATMENT.

BY W. S. ELLIOTT, D.D.S., SAG HARBOR, L. I.

Of the numerous affections of the dental organism that daily present themselves for the exercise of our judgment and the interference of our manipulative skill, none, perhaps, demand nicer discrimination or a more thorough comprehension of the histology of the tissues involved than those which are located or developed in the periodental membrane.

The functions of this tissue are such as are coincident only with structures possessing a high degree of vascularity, and we observe that in proportion to the complexity of the tissue so do the signs and symptoms of morbid action of such parts tend to simulate those which pertain to the most aggravated form of disease—namely, inflammation and the further phenomena of vital estrangement and dissolution.

The enamel—the lowest in degree of vitality, the office of which being mainly mechanical—manifests no symptoms of disease other than those which arise from some outward mechanical or chemical force. From these causes we have abrasion, cleavage, and erosion.

The next in the ascending scale is dentine. In this is first prominently manifested the action of the vital forces. Its pathology is recognized in exalted sensation, decalcification, absorption, and caries.

The cementum, that medium existing between the semi-vital and the more highly organized, exhibits its functions in the protection of the delicate surroundings and the compromising of the varied influences of different degrees of life action. Possessing, as it does, a greater diversity of structure—as seen in its lacunæ, its canaliculi, and its system of anastomosing vessels, together with a larger proportion of organic matter —its sensibility is greater and its diseases correspondingly approximate

in character those of the softer tissues. Here we have suffusion or congestion, exalted sensibility, absorption, exostosis, and necrosis.

Step by step, as we approach that subtle and delicate substance the dento-periosteum, we are made cognizant of varied degrees of physical disturbance, directly and indirectly, through the causes which produce morbid action in these several tissues. But now we enter upon the veritable highway to the sensorium; here are laid the telegraphic lines, delicate in their sensibilities which quickly announce the least disturbance of the normal acts of nutrition and the natural workings of transferred forces in the ultimate disposition of the matter which has served its end in the great economy of the living.

This membrane surrounds the root and is reflected through the apicial foramen upon the central chamber containing the pulp, and thus approximates, in a measure, the exposed periphery of the tooth. This portion is, therefore, rendered more especially subject to the deleterious action of external agents in its more intimate association with extreme degrees of heat and cold—particularly if there exists decay of the dentine. The investing portion is also liable to irritation from the encroachment of foreign matter.

The progressive pathological condition of the severally named tissues, in many cases, reaches a climax in the inflammation and devitalization of the periodonteum and consequent disintegration of contiguous parts.

In the presence of periodontitis may we, therefore, return in our diagnosis, to the consideration of these affections as being among the accepted causes of the disease.

In so far as the erosion or cleavage of the enamel is concerned, we deem them entirely negative in their influence. Decay of the dentine, however, where it has progressed so far as to impinge upon the periosteum, is a sufficient cause, inasmuch as do the rough and dentated borders of the cavity so irritate the membrane as to excite an influx of blood, producing various degrees of disturbance.

The sequel of decay will also embrace congestion, inflammation, and decomposition of the pulp, the errors of manipulation and the results of misapplied medicinal agents.

Decay, as mentioned above; the deposition of salivary calculus; the impaction of food between the teeth; the overhanging of illy-finished fillings at the neck of the tooth and the insinuation of arsenious acid beneath the free borders of the gums are direct causes, and directly is the normal condition restored upon the removal of the excitant.

Superabundance of filling is a cause, less direct, perhaps, but by producing mal-occlusion, the functions of the tooth are overtaxed, the vitality of the periodonteum is in a measure exhausted, and subacute or chronic inflammation, the result.

Filling matèrial forced through the apicial foramen may be counted

among the causes of periodontitis, and, perhaps I may say, it is fortunate for the well-being of the tooth and its permanent retention in the alveolus that most operators are not so thorough in their treatment as occasionally to include the foramen in the field of their manipulations. Gold or other material actually beyond the orifice is a constant source of irritation, and will generally necessitate the removal of the tooth.

Protracted and violent manipulation will often arouse the dormant fire of inflammation. Care and gentleness are our great prophylactic, and while we would assist nature in her endeavors to restore the functions of the parts, due caution should be exercised that we do not oppose the forces which are creative and which alone are the agents of restoration.

The local action of medicines is still a further cause, of which we may instance the undue application of arsenious acid in the devitalization of the pulp; the too free use of chloride of zinc or other substances in the treatment of sensitive dentine, or the effusion from the mucus follicles; and the constitutional exhibition of mercury or other excitors of ptyalism.

In regard to the first of these causes, we find the manifestations more prominent in young teeth, from which fact we assume the more ready absorption of the agent, or its transmission (if we admit that it enters the circulation at all) through the yet uncontracted foramen, and the consequent extension of inflammatory action. Whatever may be the *modus operandi* of the applied medicine, strangulation of the circulatory vessels of the pulp at the apex is in such cases prevented, and the phenomenon suggests to us at least the propriety of diminishing the dose to the smallest quantity that will meet the ends indicated.

Loose roots cause irritation, but the effects may be treated upon general principles, and the roots, if healthy, retained.

Having thus referred to many of the circumstances which break in upon the normal condition of the tissues, we must not forego the consideration of the most fertile of all causes, inflammation and decomposition of the dental pulp.

The contiguity of structure favors the diffusion of the disease, and so far as the investing portion of the membrane is concerned, its confined locality is a further prominent circumstance of aggravation.

With the primary stage, from whatever cause, we have pain or uneasiness, accompanied with a constant desire to work upon the offending tooth as the prominent symptoms. The arterial vessels are, at this point, the only ones seriously involved. Should our diagnosis point us to an inflamed pulp, the treatment may be both topical and constitutional. Slightly puncturing the pulp will relieve the engorged vessels within the tooth, and the application of one or two leeches upon the gum will have a tendency to deplete those of the investment.

A saline aperient may be given, especially if there is plethora, and after amelioration, the pulp may be further treated according to the judgment of the operator.

The second stage is characterized by throbbing pain, great tenderness upon pressure, a slight expulsion of the tooth from the alveolus, redness and œdema of the gums. Here we have congestion of the capillaries, as well as of the larger vessels, infiltration of serum into the areolar tissue causing œdema; accelerated, interrupted, and retarded circulation—the conditions of pain, heat, and redness. At this stage the pulp has probably lost much of its sensibility, which circumstance renders it an easier matter to make a free opening into the pulp chamber. We would prevent occlusion by interposing a guard between the teeth, and use constantly an antiphlogistic mouth-wash, say:

℞.—Potassa chlorat. ʒij;
Aqua font. ℥viij;
Tinct. opii, ℥ss.
M.

Bathe the face and forehead freely with cold water or cold vinegar, and take liq. magnesia citratis ℥xij, keeping the system as quiet as circumstances will permit.

The above symptoms as often lead us to diagnose a putrescent pulp as otherwise. In such cases we refer to the evolved mephitic gas as being the more active agent. The thorough cleansing of the pulp canal by syringing or otherwise, should claim our first consideration, and if the other indications are promptly met we shall be enabled to form a favorable prognosis.

The third stage precludes any attempt at resolution. The blood constituents have become disorganized, nutritive action has ceased, and effete cell-matter, being non-absorbed, is retained to act as an irritant to the final destruction of the bony parietes as well as of the periodonteum.

This disintegrative action is continued until egress for the purulent matter is obtained, after which the active symptoms subside. Three or four days is about the period of consummation, unless the time is shortened by treatment, to institute which we would stimulate the gum directly over the seat of trouble with tinct. or pulv. capsici—combined with chloroform, if the simple application produces too severe pain. As soon as fluctuation is apparent, recourse should be had to the lancet, which will give quick exit to the accumulated pus and speedy relief to the patient.

ON THE PART PLAYED IN THE CIRCULATORY MOVEMENT BY THE RED-BLOOD CORPUSCLES.

BY PROF. RUFUS KING BROWNE,

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(Concluded from page 238, vol. ix.)

WHY does this fluid, which occupies the calibre of the vessels, and is to actually receive the oxygen a few seconds after it is taken hold of by the globules, not itself first take it? The oxygen does not alter the substance of the globule. The oxygenating effect is to take place in the plasma of some part of the circuit. Why, then, do the globules take it up to communicate it almost instantly to the plasma, that the latter may be oxygenated or effected? Simply because *in substance and form* they are fitted to do so. These constitute their anatomical characters as organs, and the phenomenon is their physiological work. But this is to acknowledge that all there is physiologically characteristic in the transaction is due to the vitality of *the globules*. To the globule therefore must be attributed some physiological power, which they possess in common with every other minute body or organ in the organism. This power we have always attributed to the latter in their degree; to every cell of every gland and every tissue; to every body in the organism in which could be found an inherent power of change, or claim an individual status and form, however minute. But does this power pertain to the globule only at the instant of its taking the oxygen? Do we attribute to it a power which exists only at the moment it takes oxygen in the lungs; and that it is inert and passive during the rest of each round of the circuit? But let us see if it has not done what involves the existence of the power we attribute to it in the lungs, each round *before* it reaches them. Indeed, let us see that it is only in virtue of its action, dependent on the physiological power we admit it while *in the lungs*, that the adjustment of conditions is such as to effect the work of oxygenation. It has often been observed that the red globules are so closely huddled in the capillaries of the lungs, as to fill almost their entire calibre. There is so large a *disproportion* of them to plasma, as to form almost a complete exclusion there of the latter. How does this phenomenon, here and here only, in such contrast to the proportions in some other situations, happen? It is regular and invariable. But one explanation of this phenomenon is possible. Is it a phenomenon done by the plasma or globules? One or the other, it must be. If by the former, then it is an *accumulation*. Has it been done by the former pushing forward successive crowds of globules *at a faster rate than itself*, involving retardation at some point ahead, so that the successive crowds could meet, and holding itself back at a slower rate? or, has the plasma,

from the right ventricle, flowed at a *faster* rate than the globules distributed throughout it, leaving them collected and collecting in the lungs with hardly enough plasma to surround each globule? In the first case supposed, what becomes of the plasma without globules, or with few globules, seeing it is separated from its due proportion and they ahead—and seeing that a fresh charge of blood equal in volume to itself is being pushed forward and must press it forward? It must advance into the lung capillaries as plasma, devoid of globules it had sent from itself elsewhere ahead. In that case, we have successive sections one after another of plasma with no globules, and globules with scarcely any plasma in the pulmonary circuit. Or, as supposed in the other case, has the plasma separated itself and advanced ahead of the globules, *leaving* them collecting by themselves in the lung capillaries? But the plasma behind and continuous with the columns of globules in these capillaries, is pressing into them, pushing those onward out of them, and pushing forward within them its proportion of corpuscles behind. And in this case also we have alternate plasma and globule sections of the blood column, as in the first supposed case. Neither of these suppositions, then, can be like the actual state of the case. In both cases the variation in proportion of globules and plasma, in different situations or sections, one after or before another, in the stream of blood, and the very great disproportion of globules in the pulmonary capillaries, was attributed to the *action of the plasma*:—but any supposition which proceeds upon the theory that they are caused by some power in the plasma, must fail and be at war with the facts. But what is of the utmost consequence, is that any supposition which really accounts for the actually existing variation,—this exclusive predominance of globules in the pulmonary capillaries,—whether it be due to either plasma or globules, will be found to *disprove* our present notion, that the plasma merely carries the globules. But if it is not due to the plasma, is this excess of globules, in the situation in question, due to the action of the globules? If it is, then it is certain that the power which we assigned to them *in* the lungs, does not begin and end in the moment they are taking oxygen there, but is exerted before they reach the lungs, and throughout the circuit up to that time. We have seen that on the supposition that this variation is caused by the plasma, alternate sections of plasma and globules will occur. It cannot therefore be due to any motion of the plasma. It is, on the contrary, in reality due to the globules; and occurs because the globules in the great dispensing avenues of the circuit, regularly move at a different rate from the plasma; and the phenomena they present in the lungs constantly occur, because comparative accumulation of the globules with a small proportion of plasma constantly exists in other great avenues as a *consequence* of their rapid flow. The disproportion of red globules therefore which crowd the capillaries of

the lungs, is only a continuation of the disproportion in the blood, which reaches and is impelled from the venous side of the heart into the pulmonary capillaries. In the veins this great disproportion is constant, and occurs because the red globules reach them quicker than the plasma, thus inducing a comparative accumulation of them and retardation of the movement of venous blood.

The significance which all the facts relating to the globules forces upon our comprehension is, that although they move in a certain medium, they move in and of themselves. Here then some one may demand, why then does not the blood consist of them alone? and why is the fluid necessary? A moving *fluid* is essential to circulation; one impelled from certain points to certain points, because it is that fluid, and not the globules, which run to nutrify and supply the tissues and receive their waste. A moving fluid impelled in a certain direction and round again, is essential for the globules to move in; because *their movement in itself* is not one which would constitute a circulatory *round.* Let us fully understand this truth. Suppose the circulating substance consisted merely of red globules which are to traverse a long circuit. To run away *from* a certain point throughout this circuit and converge round *to* a certain point, demands impulsion and an impelling apparatus. In the case of the body, this is the heart. And such an impelling apparatus can only possibly impel a *fluid.* Every particle of a fluid is in absolute cohesion and continuity, and the force exerted upon it will be a *common* and *undivided* one on every one of its undivided particles. But a crowd of red globules could neither be acted on nor impelled in this way. They can only be acted upon or act in the medium of the fluid. The fluid of the blood is not only essential therefore to nutrition and the sustenance of the body, but is essential to any *circulatory* movement. So, too, the apparatus, heart and channels, is essential to a circulation. Not alone in the case of man, because of the force it exerts on the column of blood, but because such an apparatus of a double character is absolutely the only one by means of which a return or round of the circulating fluid to the starting point, can be diverted in a new direction, and round, as it is, by the heart to the pulmonary circuit. Only a fluid can circulate or perform this round; and a fluid running in a certain way is the only possible basis on which these globules can perform their functions. Nor can these functions be performed in a *still* fluid, but only in a fluid which is moving in a certain pathway in which they *are involved.* Of course if this fluid comes to rest in this pathway, they cannot take up and carry forward that movement, because it is only communicated by *propulsion* to a fluid. Is it expected that any one of these globules should move with a greater *force* than that of the heart impressed on the fluid. This movement of the fluid is not a *physiological* character of its substance, but is *forced* by the

heart. Nor is the movement I attribute to the globule a movement of mass, but of each one, and has no effect unless based upon the movement of the fluid absolutely common to all.

Nevertheless, the character we have assigned to the red-blood corpuscles is evinced in its motion in the plasma. It moves about and bends itself, it turns about, and partly over and around. It advances Indian-file in some situations, and in others crowds in, one with another, several abreast. It crowds in certain situations so as to nearly exclude the plasma, while in others it forms but a small proportion of the vessel's contents, compared with the fluid. All this is true of the red globule of cold-blooded animals, the outermost zone of which consists of substance rigid as compared with those of the higher order of animals.

The rate of movement of the red globule is an advance upon that of the plasma, and upon no other fact can we possibly understand the occurrence of such phenomena as those in the pulmonary capillaries. What excludes *the fluid*, and yet freely permits the entrance of the globules nearly separate from plasma? Is there any power in the lung *tissue* to make this selection and exclusion? We know with entire certainty that there is not. There is no such power in *the tissue*. The exact truth is, that this condition of the blood there, namely, the great excess of globules, is a continued exclusion of fluid from the blood as it is before it reaches the pulmonary circuit. No separation of globules from plasma, with enormous excess of the former and diminution of the latter, occurs in the lung tissue. The blood in which this disproportion exists is precisely as it comes to the heart from the general venous system, and is thence impelled into the pulmonary capillaries. This disproportion always exists in the venous system, varying in different situations of the venous channels. The greatest number of globules to the plasma exists in the side of the venous system nearest the heart, and the least nearest the systemic capillaries.

What is the physiological cause of this? In answer to this question, we say, that the facts admit of but one statement of fact which bears the character of an explanation. This statement is, that the globules move in advance of the plasma, before reaching the venous system, and thus gather there, in great disproportion to the plasma. This is only possible by the globules regularly preceding the body of plasma immediately surrounding them, when they leave the heart, onward to the veins. Let us furnish a negative proof of this statement. We have seen that there is one fact about which, or about the character of which, there is not any uncertainty—the fact that the globules do crowd certain vascular situations, to the exclusion of the plasma, there being scarcely enough of the latter in the pulmonary capillaries to wet them. In that situation this is normal. We have seen already that our suppo-

sition that this is due to some action of the plasma, only leads to the supposition of what we know does not and cannot occur. The supposition showed that it cannot possibly be due to the plasma. But in other situations there is a separation, or change in the proportion together, of the two elements of the blood, its wet, soft-solid and fluid constituents. So that in a given stream or volume of blood in the channels there is an enormous excess of globules over fluid. Now what is the cause of this? There are only two elements involved, and it must be one or the other of them, or both. Is it the plasma, which advances through and between the globules, they hanging behind? But in that case the globules *would* inevitably accumulate in the *arterial system*, and delay its movement, in spite of the action of the heart, for a time.

This supposition involves the result of stoppage of the circulation at that point in the channels nearest the heart or propelling point—since inevitably, if the globules are left behind, they must remain stayed or retarded, successive globules coming up at the cardiac end, will join the stayed throng While the only force supposed to leave them behind, that exerted by the heart upon the plasma, is the only one which can carry them forward. And this is an example of how any supposition which assigns these changes in proportion of globules and *plasma*, to any movement of the plasma, and not the globules, in different situations, must certainly lead to direct stoppage of the circulation. There is no possible way either in which we can assign these changes to the plasma, and regard the globules as passive bodies, which does not presume for the plasma the opposite and contradictory qualities, first, of at once carrying the globules forward at its own rate; and, second, the power of leaving them in its path behind. Either of these suppositions leads to stoppage. And there is no way in which we can attribute *either* of the supposed powers to the plasma, without denying the received theory of its carrying the globules at the same rate, as it is itself impelled. Moreover, on this supposition, three distinct and unexampled phenomena have to be accounted for. First, a *strange force* to account for the retardation of globules, seeing that our current description is, that the movement of the plasma *carries* or moves the globules. Second, a force which, on coming, carries the column of plasma at such a rate through the thick accumulation *en masse* of gathered globules, beside the certain results of such an accumulation in the arterial system.

But none of the phenomena given in this supposition either do or can exist, and, in fact, on no possible supposition can we trace this disproportion in question to any behavior of the plasma.

There is only one other of the two blood elements to which, as we have seen, it must be due. This is the globules. The globules regularly advance, throughout the great dispensing channels, more rapidly than the accompanying portion of plasma in which they are suspended. At

this rate they *move with them a certain limited portion of the plasma*, the central part. The "side" layer, though not *still*, is an incident of the difference in flow of plasma and globules. In the one the fluid contains no globules, but the globules move within a fluid which moves in virtue of cardiac impulsion. Can we suppose that this motion is due to so much of the *plasma* as goes along with the globules? But what power can be assigned to the movement of this portion of the fluid by itself, which is not equally impressed upon every part of the rest of it exactly alike. Certainly none. This increased motion, as a fact, whatever its cause, can only be attributed to the globules. The globules, therefore, regularly reach the venous system in advance of plasma, and in it greatly exceed the proportion in which, in the blood in other parts of the system, they are to the plasma.

It is sufficiently evident that if the relation of the plasma and red corpuscles to motion were the same, or if the corpuscles were moved simply from without their own proper substance by the motion of the fluid in which they were suspended, the proportion of the two would necessarily remain the same throughout the circuit. No matter whether the entire medium came to rest, or went faster or slower, the proportion of globules and plasma would remain the same. The corpuscles would not move, but only the fluid in which they were; as a crowd at rest or stationary, move on a boat. This disproportion or excess of globules is the obvious fact to be accounted for; and this implies a disproportion or excess of plasma in some parts of the circuit, not just anterior to the pulmonary capillaries, but in another division of it. And it is vain for us to attempt to account for this disproportion by any imagined action of either the plasma or the vessels.

But the inquiry may be made—can this disproportion be accomplished by the blood-vessels? Have the blood-vessels any *action* upon their contents? This inquiry *seems* neither unreasonable nor absurd, because, in the absence of any real knowledge or thought on the subject, or the absence of any made up state of mind about it, there has been a notion that the vessels *act* upon their contents. Undoubtedly they act upon their contents to *forward* them, but then it is the *fluid* they *act* upon, and their action is only of that character which pushes or forwards the *fluid* column. Apart from that, of course they do not act on the globules, and what their relation to *this* action is, we have already defined. The vessels which act thus, too, are precisely *not* those in which this *fullness of red globules* occurs. For it does *not* occur in the arteries—the vessels which act. Their action could not, therefore, alter the *proportion* of globules to plasma. No mere outward action of its containing vessels could possibly effect the gathering of the globules, and the decrease or exclusion of the plasma, which exists in the crowding of the former to the exclusion of the latter in certain situations. All the action

of these vessels is a *normal* one, and if they could effect this disproportion, it would, of course, exist in *all* situations due normally to their action. But it is sufficiently obvious that no *action* of the vessels or tissues can account for the phenomena in question. Given the actual agent flowing within them which effects this disproportion, the arrangement or anatomical character of the vessel, its *kind*, not its *action*, would have something to do with the *situation* where this fullness of globules occurred.

We have now entirely exhausted every supposition which attributes to either the plasma or the mechanical action of the vessels this phenomenon of collection of globules, and have failed to find that either of such suppositions can possibly account for it.

Of course, if the *true character* of the phenomena was at all understood by physiologists, there would be no occasion to follow such suppositions in order to be *sure* that the phenomena *cannot possibly* be due to either the plasma on one supposition, or the vessels on the other. This phenomenon of disproportion of globules is a constant one in the veins, and the excess of globules—their crowding together with but little plasma—which constantly exists in the blood of the pulmonary capillaries, is a continuation of the same excess existing in the venous blood before it reaches the venous side of the heart. It occurs in the venous channels, from the character and relations of that part of the circuit. These channels are *collecting* channels. The excess of globules in the blood of these channels *implies* the existence of these vessels, in which blood proceeds very slowly. The accumulation is a consequence of the more rapid advance of the red globules than the plasma, and hence they come together and accumulate. Of course, if the entire circuit of channels were simply a continuation of the arteries, this could not occur, because nothing in vessels exclusively of that character could exist to hinder the globules from making the entire round *through* the plasma, the whole extent of the vessels, and no condition of accumulation would arise. But in the veins the liquids of the body do accumulate. Their contents receive no direct propulsion. Hence the blood-globules, on reaching them, come together and accumulate. The *plasma* in the capillaries is thus prevented from freely advancing,—and thus the excess of globules in the venous blood is effected. What the work of the globules consists in, therefore, is not this *total* accumulation, but in continuing their advance into the veins in great numbers, while the slower-going plasma occupies the capillaries and fills them to repletion. Do not the globules here carry themselves forward at a different rate from that at which the plasma carries itself forward? Do they not, just here, *do* something? And is not the characteristic part of the transaction theirs? Is the plasma *withheld* from advancing? The propulsive force is still acting at a distance to press the plasma

in the direction of the veins; for the transaction, we must remember, is not confined to the particular situation we have mentally in view, but is continued back to the cardiac end of the arterial column of blood. But the globules are *moving* forward. They continue their advance. They do not crowd here. That occurs only at a point beyond, where there is less, if any, movement of them, *i.e.* in the veins. If they crowd the capillaries, it is backward from the veins. It is because the crowding increases *backward* toward the capillaries.

Every movement of the red-blood corpuscle, every change of it in the fluid in which it is suspended, attests the existence in it of physiological *power*, and qualities in it not derived from the plasma, although that is the theatre of its evolution. All the modification in the circulation considered as a normal process, upon the continuance or recurrence of which the *functions* depend, is traceable to the red-blood corpuscle—its character and movements. When they crowd the pulmonary capillaries, to imbibe the oxygen they afterward emit in the fluid in which they are suspended, the act is a true physiological one—just as truly so as when a cell imbibes pabulum, or when the cellular constituents of a gland take up certain materials from the blood, elaborate, and secrete them. We accredit the elements of every tissue in the body, held statically in position, with the physiological quality of "irritability," implying response on its part. But to this wonderfully mobile body—the red-blood corpuscle—we literally deny those qualities, and only assign to it the role of a passive receiver of impulse, without any form of animation.

[The earliest hint, in our literature, that not merely and exclusively to a particular apparatus, as vessels or nerves, but to every soft-solid or changing anatomical element, each in its degree, was to be attributed physiological acts in our bodies, was given by Virchow, as follows:

"I am not satisfied with talking about the action of the vessels or an action of the nerves, but (why) I consider it necessary to bestow attention upon the great number of minute parts which really constitute the chief mass of the substance of the body, as well as upon the vessels and nerves. It is not enough that, as has for a long time been the case, the muscles should be singled out as being the only active elements; within the great remainder, which has generally been regarded as an *inert mass*, there is in addition an enormous number of active parts to be met with."—(*Cellular Pathology.* Rudolph Virchow.)

The contradictions above named are seen in nearly the order we have stated, in the following, from the latest compilation on physiology:

"In studying the circulation under the microscope, the anatomical division of the blood into corpuscles and clear plasma is observed."

"The corpuscles being comparatively large, and floating in a plasma which forms a distinct layer at the sides of the vessel."

"A few white corpuscles are constantly seen in this layer. They move slowly."

"In vessels of considerable size, as well as the capillaries, the corpuscles occupying the central portion move with much greater rapidity than the rest of the blood, leaving a layer of clear plasma at the sides which is *nearly* immovable."

"This curious phenomenon is in obedience to a physical law, regulating the passage of liquids through a capillary tube."

"When we come to the smallest arteries and veins, and still more the capillaries, the capillary attraction is sufficient to produce the 'immovable layer,' 'called by many physiologists the "still-layer," and the liquid only moves in the central portion.' (In the lungs) 'it has been observed that the larger vessels are crowded to their utmost capacity with corpuscles, leaving no still-layer, such as is seen in other situations.'"

"When the circulation has been for a long time under observation," * * * "the central organ becomes more and more enfeebled. At this time the corpuscles cease to occupy exclusively the central portion of the vessels, and the clear layer of plasma next their walls, which was observed in the normal condition, is no longer apparent." (Compare with previous contradictory statement, showing that there is at least one "*normal*" situation, namely, the lungs, where this clear layer does not exist.) "There is actual oscillation in the capillaries." This "is explained in the following way: as the heart has become enfeebled, the contractions are so infrequent and ineffectual, that during their intervals the constant flow in its capillaries is entirely arrested. But *this feeble impulse of the heart is propagated* through, and produces a slight impulse even in the smallest capillaries." This is in direct and positive contradiction to the account of capillary circulation on the preceding page which reads: "The movement in the capillaries is always quite slow compared with the movement in the arterioles, and is continuous. Here at last the impulse of the heart is lost."—(FLINT. *Human Physiology*, vol. i. pp. 288–9. 1866.)

Such statements indicate the extremely unsatisfactory state of our knowledge as represented in books. All these contradictions occur in a few paragraphs of a large work.]

ADDENDUM.

[That the oxidation it effects of the materials of the plasma, through which they move, is really a physiological *act* of the red-blood globules, and not an act of the oxygen, is demonstrated by the fact, that if pyrogallic acid, a substance which combines eagerly with free oxygen, be

injected into the blood, it will leave the animal's body without becoming oxidized. In other words, the oxygen does not leave the globules to combine or oxidize a substance which has for it a great affinity. The red globules will not give theirs, but, moving about in the plasma in the regular order of the circulation, they come freely in contact with every least part of the plasma, and are thus enabled to do so. The experiment is a demonstration that the oxygen is neither in a free nor merely dissolved condition by the globules, but is really appropriated in a certain proportion by the globular substance,—and that although not free, will be delivered by them. This simply but conclusively shows that the oxygen is not the *controlling* agent in this transaction. And its behavior shows it has not the freedom it has in all other cases. Corroborative also of the fact, that it is in virtue of some distinctly animate property that the globules absorb the oxygen, and are not the simple passive recipients of the oxygen, as in ordinary chemical operations, is the fact that if *carbonic oxide* be brought into contact with them, it will displace the oxygen, and be absorbed instead, but the blood globules are thereby rendered wholly incapable of any further vital action. The act of substitution is one which is only accomplished by changing their substance and destroying vitality. Their vitality, and not their substance, has been completely destroyed. They retain their form, but are devitalized, or, as Bernard represents it, mineralized by the carbon gas. The carbonic oxide *expels* from them its own weight of oxygen. By experiment, it is found that ordinarily there is left in the globules of even venous blood enough oxygen to furnish a two-line spectrum, but the carbon gas expels *all* the oxygen.

If it is the red globules which are the active appropriants and distributants of the oxygen to the plasma, it is the plasma which holds the carbonic acid, in which it is brought to the lungs.

It has been held as a reasonable supposition, that on becoming deoxidized, the blood globules took up carbonic acid; but we are now certain that this gas is held by the plasma, and not by the globules.]

PROFESSIONAL ETCHINGS.

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SAILING from New York April 13th, I found myself after the lapse of some twelve days in the City of Paris. As I desired to reach the most distant points of my destination as expeditiously as possible, and finish my travels in Egypt, Palestine, and Syria before the hot season came on, I decided to leave at Paris, until my return, such dental instruments and all other professional *impedimentia* I had taken with me, except a small pocket case of surgical instruments for use in case of accidents—

and certain medical remedies, as quinine, etc., indispensable to the health and comfort of the Eastern traveler.

During the voyage across the Atlantic, the surgeon of the steamer Arago having a patient who was suffering from diseased teeth, had called upon me for advice, and desired me to perform the necessary operations for the relief of the sufferer. Of course I responded to the demand, and received from both the patient and surgeon the acknowledgment of the grateful appreciation of my services. It was with the view of rendering aid and relieving suffering humanity in special cases of this kind, and also to afford to an isolated brother in the profession struggling along under great disadvantages and difficulties, an opportunity now and then of witnessing such operations at my hand as might possibly reflect some light and encouragement upon his pathway, and perchance stimulate him to a higher standard of dental practice, that I was led to take with me from Philadelphia a small stock of material for filling teeth, in the shape of gold foil and plastic gold, together with the requisite number of the most approved modern dental instruments of American manufacture for performing the more important operations. I began to realize that my original plan, however benevolent and praiseworthy, could not be carried out without imposing too heavy a tax upon my time, and seriously interfering with the intended and necessary expedition of my trip. It was not, however, without some feelings of reluctance that I left the excavators and pluggers behind, and with them all my cherished hopes of being able to honor and immortalize American dentistry, by leaving among the pyramids and hieroglyphics of Egypt, the record of some golden operations upon the dental organs of the reigning monarch of the Ottoman Empire, or the Pacha of Egypt. But I received ample compensation for my blasted hopes, in the long-desired and joyous freedom I realized in my anticipated separation for a few months from all the implements, and relief from the close confinement, and onerous duties of my profession. Subsequently in all my travels there were only two instances in which I felt the slightest regret at having left my dental instruments. The first instance was when our dragoman or guide, Mustapha Hassen Mussa, met with a most singular and painful accident. It occurred in the following manner. One day as we were traveling along the Phœnician coast of the Mediterranean Sea, on our way from Tyre to Sidon, we came to the ancient Leontes. It was a hot day, and we were all fatigued and thirsty. Our jaded horses too, as well as their riders, were glad to stop and rest upon the verdant banks of this classic stream, and slake their thirst with its cool waters fresh from the snowy mountains of Lebanon. There were some two or three native women filling their earthen jars with water, and our dragoman asked them to give us a drink. One of them handed to us a *goulah*, an urn-shaped earthen bottle filled with water, from which we all took a

most refreshing draught sitting upon our horses. Our dragoman then drank, and while in the act of drinking, his horse, being a restive animal, suddenly threw back its head, striking the bottom of the *goulah* with a force so great as to produce an oblique transverse fracture of his right superior central incisor. It was a large sound tooth, and the crown adhered to the gum on the palatal side, while the delicate and sensitive pulp was exposed and bleeding, irritated by the sharp broken edges. It was a sad blow. Poor fellow, I pitied him! His sufferings for awhile were most excruciating. He cried like a child, and I did not wonder. His loss as well as his suffering was great. I then wished for the means to relieve his distress and repair so far as possible his sad loss. The second instance was while I was at Damascus. Through the kindness of Dr. Meshaka—acting American consul—to whom we had letters of introduction from Dr. Jessup, American missionary at Beirout, we had the favor of an introduction to the distinguished Algerine Emir Abd-el-Kader, with whom we had a most interesting and pleasant interview, a son of Dr. Meshaka acting as interpreter. It will be remembered that Abd-el-Kader successfully resisted the French forces for many years, and proved himself a brave and able general. He was finally defeated and captured by greatly superior forces, and was imprisoned by Louis Philippe in the Castle of Amboise, in France. In 1853 he was released by Louis Napoleon, and retired to the ancient City of Damascus with a pension of thirty thousand dollars a year. At the time of the bloody massacre of the Christians in Syria by the Mohammedans in 1860, he nobly interposed in behalf of the Christians, placing himself between them and their blood-thirsty persecutors, and thus arrested the further flow of blood, saving many thousands of helpless men, women, and children from a terrible death. By this truly brave and noble act, he has endeared himself to the Christian world. A prisoner of war, on his parole of honor, he lives in princely style, surrounded by a retinue of servants. At the time of my visit to him, on learning my profession, he expressed a desire that I should operate upon his teeth. I was obliged to confess my inability to grant his request, as I had not the necessary instruments. You can imagine my feeling of sincere regret. Favored with so distinguished a patient, it would have been a pleasant professional reminiscence in after-years, in the event I had bestowed upon one so worthy, some of the benefits of our profession in this the oldest of cities—the paradise of the Orient, the seat of the Caliphate about which I had so often read and wondered in my early youth.

On my return to Paris, I mentioned the circumstance incidentally to Dr. Evans, who informed me that in former years he had been a patient of his, and asked me if I had noticed that he had lost one of his superior incisors. I told him I had. He then related the following incident. He proposed to Abd-el-Kader, among other operations, that he

should have that missing tooth replaced with an artificial one. No, he said that must never be done, for he had lost that tooth while engaged in battle; and the Koran said "that he who fought for his country must fight even to the losing of his teeth."

PULP CALCIFICATION, ETC.

BY HENRY S. CHASE, M.D., D.D.S., ST. LOUIS, MO.

I do not propose to take up the process of dentification of the tooth germs, but only to make a few remarks on the conversion of the dental pulp into hard tissue, as we often find it occurring in the teeth of adults.

The process of hardening is effected in three ways—namely, by Calcification, Ossification, and Dentification.

The great mass of the pulp is, histologically, connective tissue. Now, when a pulp is to be calcified, it is not merely infiltrated with lime salts; veins, arteries, and nerves are *not* merely petrified, and thereby converted into bone. But veins, arteries, and nerves are differentiated by the *power* which presides over the process, and the whole are converted into simple connective tissue *cells*.

After this conversion, and during the process, the lime salts are taken up by the cells and packed into the interstices between them, and are also retained by the cells in large quantity.

This is accomplished by the *action* of the cells, which take up these salts from the plasma of the blood, those nearest the blood giving it up to those more distant, passing them from one to another by osmotic action, until the most distant one from the blood-vessel has received an equal share with that which is in closer proximity to the source of supply.

When a pulp is thus transformed, it is neither dentine or cementum; neither is it bone; it is only calcified connective tissue. This is what I mean by CALCIFICATION OF THE PULP.

This is the most *simple* process which takes place in this ostoid change. And part of this process is the first change or differentiation which must occur before a pulp can be either ossified or dentified.

The cementum is so nearly if not precisely like true bone, that I shall speak of it as true osteogenous tissue.

OSSIFICATION OF THE PULP, or of any other tissue, is not a mere hardening, by lime salts, of that tissue. There can be no true bone without bone corpuscles, or bone cells.

Therefore before the dental pulp can become bone, the connective tissue cells must be converted into bone cells. This takes place by a shooting out from the sides of the connective tissue cells of little processes or tubes which anastomose or communicate with those of adjoin-

ing cells, and thus furnish a means of communication through every portion of the pulp.

These cells and prolongations are for the circulation of the liquor sanguinis or plasma of the blood, which must furnish the lime salts for the hardening process. These salts of lime are first deposited in the intercellular spaces. They are packed with it, but the cells themselves are not stuffed with it until they are a solid mass! They retain more or less of these salts in their cavities, and sometimes become very small in capacity in consequence of it, as may be seen in the teeth of old people or those which are of a very solid texture.

In the same specimen we often see very great difference in the size of these bone cells, owing to the filling up of their interior.

Dentification of the Pulp.—It has been customary to call a hardened pulp by the name of "secondary dentine."

This is not true. For calcified connective tissue is not dentine. Ossified pulp is not dentine. We may have calcified pulps without a particle of secondary dentine.

What is dentine? A structure composed of parallel tubes. These tubes have been described by Tomes as being formed by the union of simple cells which have previously arranged themselves in rows. A liquefaction of the cell walls where they touch makes a continuous tube.

When dentification of the pulp has taken place, the dentine is not as symmetrical in its appearance as that of the crown or root. The tubes are generally very irregular; crooked and do not run parallel to each other. In fact, they are often as crooked as the bone cell processes or prolongations.

In those cases where we find regular and true dentine, the process takes place as described by Tomes in his description of the formation of dentine.

As I have previously said, the pulp becomes a mass of connective tissue cells first, and then the *power* which presides calls them into line, and they change into tubes as before described.

But they are not *always* thus changed.

Secondary dentine of the pulp is often differentiated from bone.

The process of transformation having gone on until *bone corpuscles* have taken the place of connective tissue cells, the former are changed into dentine tubes. The bone cell processes or tubes are thrown out from the sides of the cell more numerously; they communicate directly with those of others; the walls of the body of the bone cells contract, and thereby still further lengthen the tubes, and finally the cavity of the cell is gone, and tubes traverse the space occupied by them.

This gives the tortuous appearance to the tubes of much of the secondary dentine of the pulp. In making microscopical specimens, we find portions of these tubes mixed up in inextricable confusion, seeing long tubes, short tubes, and the ends of tubes in close proximity.

Furthermore, we often see bone corpuscles among these tubes, just as perfect as we see them in the cementum.

Are not the interglobular spaces which are so often seen in dentine, the remains of a bone or cementum cell?

The three processes which I have described, often take place in the dental pulp simultaneously. All three are progressing at the same time. Most of the microscopical specimens will probably be found to exhibit the two latter ones, and many will also show all three.

In these transformations, where does the process begin?

That depends upon the causes which produce them. Nearly all the cases which have come under my observation have been produced by caries or dental decay. When this is the case, it more frequently commences in that portion which has become, or is becoming, exposed to external influences by a cavity of decay.

Sometimes it commences in the central portion of the pulp, and if it has not progressed far, we find a small nodule of ostoid substance like a shot inclosed in the substance of the pulp.

In a specimen which I prepared to-day, the whole pulp of the crown was indurated and stood up in its pulp cavity perfectly free, excepting at the bottom, where the root canals commenced. *There* it was attached throughout to the tooth. The pulp was *almost* in contact with every part of its cavity. The tooth in which I found it had a large crown cavity reaching to and exposing the pulp.

We often find the pulps of canines and incisors completely indurated, especially when their lingual surfaces have been worn down by the attrition of the under teeth. Also the molars of elderly people wear down, and the pulp becomes alarmed and attempts a transformation of itself into a tissue which will bear mastication. Pain is experienced by the contact of food and cool liquids. I have many of these cases to treat, which I do by drilling to the pulp cavity and devitalizing what there is not transformed.

In nearly every case I find the pulp chamber unnaturally small; and often find an obstruction in the centre, showing the bulb of the pulp to have indurated, and the smaller portion at the entrance of the root canals to be in a state of excitation, if not inflammation.

DENTITION—ITS PATHOLOGICAL AND THERAPEUTIC INDICATIONS.

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(Continued from page 248, vol. ix.)

The difficulty of rearing infants upon other than their natural food has been clearly proven by hospital records, which show that the effort re-

sults in the destruction of 40, 50, 60, and even as high as 80 and 90 per cent. of infants thus fed; an exhibit which of course suggests a careful consideration of hygienic and therapeutic measures calculated to avert such fearful mortality.

For much valuable information in relation to infantile difficulties, I am indebted to the able works of Drs. Condie, Ashburner, Jacobi, etc., and however authorities may disagree upon other points, we find them united in recommending, as the best substitute for the mother's milk, the breast of a healthy wet-nurse, somewhere between the ages of 20 and 30 years, or but little, if any, over or under these figures.

A wet-nurse should, in addition to exemption from any bodily infirmity, be possessed of well-developed, easy-yielding breasts, and milk pure, and adapted to the age of the child; her diet should be carefully considered, and her health promoted by frequent, free and gentle exercise in the open air.

Should prejudice or inaccessibility preclude the employment of such a substitute, the selection of an appropriate diet becomes a matter of the most vital importance, involving the health and life of the infant.

The milk should be taken fresh from a healthy cow, prepared as previously directed, and administered from the bottle, for by this method the exercise is the same as when drawn from the breast, and from the food being more slowly introduced into the stomach than when given from a spoon, there is less liability of producing over-distention of that viscus.

The milk should always be obtained from the same cow, for nothing will so quickly aggravate a disordered condition of the bowels from dentition, as a change in this respect; and Dr. Dewees justly remarks, "that different cows, feeding upon the same material, often give different qualities of milk, and the stomach very generally becomes reconciled more readily to any one certain quality than to a mixture."

Prior to the appearance of the teeth, the infant should be fed upon milk alone, and nothing can prove more temporarily irritating, or permanently injurious, if persevered in, than the various pap compounds, such as flour and milk, bread and water, oatmeal and water, etc. After dentition, however, has made some progress, the milk may be thickened with a little gum, barley, or rice, or a little plain beef or mutton broth given, or even a piece of the same meat roasted may, by being sucked, yield the nourishing juices.

Dr. Gumprecht, of Hamburg, entertained a very high opinion of carrot pap as a food for young children; it is made as follows: mix an ounce of finely scraped, full-grown carrot with two cupfuls of cold soft water, allowing it to stand for twelve hours, it being frequently stirred during that period. The fluid portion is then to be strained off, and the residue then pressed, to deprive it of the juice it still retains; the juice thus ob-

tained is to be mixed with a sufficient quantity of powdered biscuit, bruised crust of bread, or farina, etc., to form it into a pap, and then placed over a slow fire, care being taken to prevent its boiling, which would coagulate the albumen; when removed from the fire, it is to be sweetened with loaf sugar. This preparation is said to contain albumen, gluten, starch, sugar, fat, and the phosphates of lime and magnesia.

The following is recommended for infants brought up upon the bottle: one ounce of finely scraped yellow carrot, two drachms of biscuit powder, and two cupfuls of soft water are allowed to stand in a covered vessel, in a cool place, for twelve hours, and frequently stirred; it is now to be strained through a linen cloth, a pinch of salt added, sweetened with sugar-candy, warmed, and given to the child from a sucking-bottle.

Either of these preparations is contraindicated by a tendency to diarrhœa.

The proper period for weaning is generally fixed at about one year, although the season of the year must be consulted, for it would be manifestly imprudent to undertake a change of such magnitude during the heat of summer, when the entire alimentary canal is in a high state of irritability.

After the molar teeth have made their appearance, the diet, although different, requires much care. Yet this is without the limit of our subject. The remarks I have already offered were designed to cover some of the major facts, without entering into minor details concerning the matter of food. Before leaving this subject entirely, a few words about *sugar*, of which children are so fond, with which they are often abundantly and injudiciously pampered, and often as unwarrantably denied. Says old Slare: "He that undertaketh to argue against sweets in general, taketh upon himself a very difficult task; for nature seems to have recommended this taste to man and all sorts of creatures."

The nutritive properties of many fruits and vegetables are due to the saccharine matter which they contain, and experience has proven sugar an acceptable and valuable addition to the food of both adults and children, and it has been pronounced by Leroy "the only condiment proper during the period of infancy."

Much has been written condemnatory of sweets, and among their opponents are men of eminence; yet it is probable that apprehension has been excited by witnessing the results of their abuse, for we would most emphatically condemn their wholesale consumption, as provocative of indigestion, diarrhœa, and indirectly of dental caries; hence they should be given in conjunction with other articles, to improve their palatableness, rather than as separate articles of food.

Concerning its direct action upon the dental structures, sugar is per-

fectly harmless, as I have proven by immersing a tooth in simple syrup, and removing it at the expiration of a year, to find its integrity unimpaired; when, however, it lay exposed to the contact of certain animal or vegetable substances, in the presence of oxygen, certain changes result, which are termed fermentation, leading to the evolution of an acid, which is as powerfully destructive of the dental structures as if originally applied in such form.

The same changes may occur in the stomach, and eructation bring the acid into the mouth, where extreme sensitiveness of exposed dentine will denote its presence. From the knowledge of these facts, we are induced to recommend the indulgence of children with candies in moderation, but forbid their excessive use, through fear of resulting morbid appetite and indigestion.

Let me append the following formulæ, one of Baron Liebig, and the other of J. Forsyth Meigs, of this city. My friend, Dr. T. Yarrow, speaks of them as follows: "Both have answered a good purpose, but my own experience gives me a preference for the first named diet, not only because of the very eminent name of the inventor, but on account of the scientific *rationale* of its action."

Baron Liebig's Food for Children.—"Half an ounce of wheaten flour, and an equal quantity of malt flour; 7½ grs. bicarb. potassæ and 1 oz. of water are to be well mixed; 5 oz. of cow's milk are then to be added, and the whole put on a gentle fire; when the mixture begins to thicken, it is removed from the fire, stirred during five minutes, heated and stirred again, until it becomes quite fluid, and finally made to boil.

"When properly prepared, the bran has been separated by sifting, and the preparation is sufficiently sweet without any addition of sugar."

Dr. Meigs' Gelatine Food.—"A scruple of gelatine (or a piece two inches square of the flat cake in which it is sold) is soaked for a short time in cold water, and then boiled in a half pint of water until it dissolves (about ten or fifteen minutes). To this is added, with constant stirring, and just at the termination of the boiling, the milk and arrow-root, the latter being previously mixed into a paste with a little cold water. After the addition of the milk and arrow-root, and just before the removal from the fire, the cream is poured in, and a moderate quantity of loaf sugar added. For a healthy infant, within the month, I usually direct from 3 to 4 oz. of milk, ½ to 1 oz. of cream, and a teaspoonful of arrow-root to a half pint of water. For older children, the quantity of milk and cream should be gradually increased to a half or two-thirds milk and one to two ounces of cream. I seldom increase the quantity of gelatine or arrow-root."

Fresh air, and plenty of it, is a "*sine qua non*" for normal dentition, for the very first want of a new-born infant is pure air, a want that does not abate during one moment of its future existence.

An atmosphere vitiated may be tolerated for a long time without the exhibition of any violent or fatal symptoms, yet, insidiously, it produces an unhealthy condition of the organs, arrests their proper development, and inaugurates affections which medical or hygienic treatment is powerless to relieve.

Consequently it is of the utmost importance that the nursery and sleeping apartments should be supplied with free but cautious ventilation, and the strictest cleanliness observed in relation to every matter calculated to impair the purity of the atmosphere; apart however from the influence of confined air within doors, the child may, although frequently carried into the open air, be deprived of its toning and invigorating influence through the ignorance which prompts the envelopment of its head and face in a hood, shawl, or veil, or its complete inclosure beneath the clothing of the mother or nurse.

When old enough the child should be daily carried into the open air, for, as Sturve remarks: "The open air is particularly grateful to the feelings of infants. When they have been accustomed to it for a few times, they evince even at a very early age a strong desire to return to it. When unable to walk they point anxiously to the door, and make efforts to approach and open it. When they can scarcely crawl they instinctively advance toward that part of the room from which they have a prospect of escaping. Often their cries can be arrested in no other way than by carrying them into the free open air."

It has been proven by close experimentation and observation that the greatest mortality among children up to the age of three months occurs during the coldest season; that it is greater in northern than in southern climates, and greatest in the former during the winter months.

Impressed with the fact that the infantile calorific powers are comparatively very feeble and that they are exceedingly susceptible to the depressing influences of cold, it becomes essential to maintain a sufficient degree of warmth in the apartments which they occupy. It will not answer, however, to accept the feelings of adults as a guide, but dependence should alone be placed upon a reliable thermometer, which may be kept at from 68° to 70° Fahrenheit.

Another influence which tends to render the *nisus* of development as it were sectional, or energetic in one part and lax in another, is a residence in large cities, especially in crowded and unhealthy localities; it exerts a powerfully depressing influence upon the nervous centres, occasioning that excessive irritability indicative of weakness, and robs them of that tonicity or strength so essential for the support and control of incipient growth.

Much might be said in directing attention to the all-important subject of cleanliness, yet it is unnecessary to do more than remark its importance. How essential it is to maintain the free and healthful action of the skin,

both on account of its respiratory and eliminative functions, and to prevent the occurrence of disgusting and loathsome eruptive affections which so rapidly follow personal neglect!

The water employed for washing infants should be warmish, for nothing is productive of more harm than the misapprehension which sanctions the cold bath at such early ages; the experiments of Dr. Edwards and others have proven that the effect of cold ablutions is invariably to depress the strength and vigor in direct ratio with the feebleness or exhaustion of the individual.

The temperature of the water may be somewhat reduced with the advance of age, yet under all circumstances where its application fails to stimulate a subsequent reaction or glow, its use is evidently contra-indicated.

Says Sturve: "I consider bathing as the grand arcanum of supporting health, on which account during infancy, it ought to be regarded as one of those sacred maternal duties, the performance of which should on no account be neglected for a single day."

Clothing is a matter which deserves attention, and its requisites have been summed up in the three words, *lightness*, *simplicity*, and *looseness*. It should be sufficiently light to prevent annoyance from its bulk, and yet possessed of substance enough to insure the necessary warmth; the simpler in its construction, the easier it is put on and removed without fretting and irritating the child by unnecessary complication: by looseness, the developing and expanding textures are not hampered, but comfort, a harmonious growth of the entire frame, and health and happiness in after-life, are fully favored.

These are the chief points in connection with dress, except the advisability of placing flannel garments next the skin during the autumnal, winter, and spring months; so worn it preserves an equable and moderate temperature of body and serves as a protection against sudden changes in the temperature of the atmosphere, and, during difficult dentition, is especially serviceable in partially obviating the many congestive diseases which the extreme mobility of the nervous system at this period so favors in the internal organs.

Exercise for the first few weeks of life is scarcely required, and the practice of dandling and tossing infants in the air as if they were dolls instead of human beings cannot be too strongly deprecated.

Besides, a child should never be placed in the sitting posture until at least three or four months old, for the undeveloped condition of the osseous system, which, from its pliancy, is unable to support the weight imposed upon it, favors curvature of the bones and other diseases which generate incurable deformities. The same restrictions apply to the efforts used to force an infant upon its feet at too early a period. Some authorities are indulgent enough to sanction such efforts in vigorous children

as early as the ninth or tenth month: it is perhaps better, however, to err upon the safe side, and extend the limit to at least one year.

In the earlier months of life a blanket or other soft covering may be placed upon the floor and the child permitted to lie and roll about, extend and flex its limbs, for indulgence in such exercise, although to appearances so triflingly moderate, promotes the harmonious development of all the organs and tissues far better than continual nursing upon the lap or in the arms, where its movements are confined and the exhalations from the adult body so impure.

As soon as it is old enough to exhibit slight powers of observation it should be frequently taken into the open air, especially in the country, where a double benefit is secured by the influence of a pure atmosphere and the salutary impressions resulting from the beauty and freshness of the scenery.

This last incentive may appear a rather weak one, yet experience has convinced me that the sweet babbling brook, luxuriant foliage, and the thousand and one inviting scenes presented by nature are as attractive and pleasurable to the infant as to the most devoted admirer of her works.

In fine, give them while yet unable to walk the benefit of frequent excursions into the open air, and, when able, in a measure, to control their own actions, allow them unrestrained indulgence in those exercises which they instinctively enjoy, totally ignoring the cultivation of the intellect, so far as scholastic duties are concerned, until the age of at least six years; for the first years of life are designed for bodily exercise, which gives the size and strength requisite for the active duties of after-life.

(To be continued.)

SULPHATE OF MORPHIA.

BY S. S. BOGARTH, TIPTON, IOWA.

In the July number of the Dental Cosmos is an article from H. S. Chase, on "Sensitive Dentine," in which he makes the announcement that he has made a "discovery," viz., that sulphate of morphia is a remedy for that very sensitive condition of teeth which is often so trying to both patient and operator.

But a query arose in my mind to-day, as to whether, at this late day, it can be regarded as a "discovery," suggested by finding in an article on "The Arsenical Paste," by Geo. W. Caldwell, in *The Dental Times* of October, 1864, the following language, viz.: "Sulphate of morphia is used for relieving sensitive dentine: here it acts by its narcotic effects, decreasing the sensibility of the nerve fibrils in the tubuli. It is, perhaps,

the most efficient agent that can be employed for this purpose, as no danger can result from its application through absorption, and should this occur, it would produce the beneficial effect on the pulp of allaying the slight irritation which always exists when the dentine is affected in this manner."

[In connection with the above, the sulphate of morphia has been frequently spoken of, during the past few years, at the meetings of the dental societies in this region, as a valuable agent in obtunding sensitive dentine; but I was surprised to find, in looking over the proceedings of the societies, that no note appeared to have been taken of the fact, and therefore published Dr. Chase's article without comment, although I had prepared a footnote to be appended to it.—J. H. McQ.]

PROCEEDINGS OF DENTAL SOCIETIES.

ODONTOGRAPHIC SOCIETY OF PENNSYLVANIA.

BY THOS. C. STELLWAGEN, D.D.S.

A MEETING of the Society was held on Monday evening, November 4th, 1867, at the Philadelphia Dental College.

M. Lukens Long, Vice-President, in the chair.

The following gentlemen were unanimously elected active members: C. N. Peirce, D.D.S., and C. M. Curtis, D.D.S.

A MEETING of the Society was held at the usual place on Monday, December 2d, 1867.

The Vice-President, M. Lukens Long, D.D.S., in the chair.

D. D. Smith, D.D.S., Professor of Mechanical Dentistry in the Philadelphia Dental College, was unanimously elected an active member of the Society.

On motion, the subject of "Fibrin" was introduced by Dr. Stellwagen, who called attention to the field of discussion, opened by the opposite views maintained by high authorities when assigning to it a position in the economy of nature.

Formerly this constituent of the blood was looked upon as the highest histogenetic organic element. More recently a contrary view has been taken by many who suppose it to be broken-down or disintegrated tissue. Prominent among those who hold to the former theory, stands Prof. Draper, of New York. This *savant* is so well known as the author of the works "Intellectual Development of Europe," and "The Civil War in America," that it would be superfluous to call attention to his learning, or the grandeur of his intellect, among those who must be so well acquainted with his productions; in fact, his name is no

less familiar at home than abroad. Renown being so seldom won by a laborer in his native land, has doubtless led many, after studying his work on Physiology, to review the various arguments on this subject.

Prof. McQuillen—The subject which engages our attention this evening is one which fully illustrates the correctness of a position which he had over and over again endeavored to impress upon the minds of students and practitioners; the importance of not being too positive and particularly dogmatical in the presentation of theories in science. Only a few years ago, every physiological teacher in the civilized world, without a question of doubt asserted in the most authoritative manner that the *fibrin* of the blood was an organic element of the highest type, whose histogenetic properties were of such an elevated character that it was ready to be immediately assimilated by the tissues. The analysis of the fibrin of the blood and of muscles by Baron Liebig, has, however, satisfied that gentleman that their chemical composition is quite different. Predicated on this important statement, quite a number of eminent physiologists and pathologists have come to regard the fibrin of the blood as effete matter—the *débris* of the broken-down tissues. What a contrast is here presented, and how valuable the lesson it teaches to be careful in examination, deliberate in reflection, and cautious in the presentation of views! For his own part, after a careful examination of the subject, it appeared to him that the old theory, which regards the fibrin as a histogenetic element, although it may differ from muscle in chemical composition, is not so far wrong as many would have us believe. It is a well-ascertained fact that in the course of digestion and absorption, the food which, during stomachical and intestinal digestion, has been converted into albuminose, on being taken up by the lacteals is changed into albumen, and that little or no fibrin is present in the chyliferous vessels prior to their entrance into the mesenteric glands; after having passed through these organs, however, and entered the vessels leading to the thoracic duct, decided evidence of the presence of fibrin is manifested, and in considerable quantities. In the thoracic duct the evidence becomes still more marked. It has been suggested by Prof. Draper, that this change is owing to the oxidation of the albumen in the chyle during its passage through the mesenteric glands, these glands being made up principally of a plexus of capillary vessels, the blood of which is richly supplied with oxygen. This view is supported by him as follows:

"Now what are the chemical conditions under which the transmutation of albumen into fibrin takes place? The problem is most clearly presented in the case of the incubation of a bird's egg. The white of the egg consisting chiefly of albumen, gradually loses that form and passes into the state of fibrin as the development of the muscular tissue of the young chick is effected; but the change cannot take place except oxygen be received through the shell; and indeed in all cases in which albumen

passes into fibrin, it does so only in the presence of oxygen." It may be objected by some that this explanation partakes too much of a chemical character, and that the changes which occur in the body are under the operation of what is called the vital principle, and therefore entirely different from what occurs outside of the body. Each day, however, science proves that the changes taking place in organic structures are in accordance with the operation of physical laws in the inorganic world. Admitting, as some assert, the fibrin in the thoracic duct to be from the lymphatic vessels, does not prove it an excrementitial, but a *recrementitial* substance, for the *venous radicals* (not the lymphatics) are now looked upon by physiologists as *the absorbents of excrementitial or effete matter*.

Prof. J. C. Morgan—It is difficult to see why the mesenteric lymphatics should be assigned such a function as the formation of fibrin, to the neglect of the more highly vitalized cells of muscle and other tissues. Again, where is the analogous organism which produces vegetable fibrin? It is here clearly the work of the tissue-cells at large. The argument in favor of mesenteric fibrinization, that near the thoracic duct these vessels contain an increased quantity of this substance, is inconclusive—since at this point the lymphatics of the lower extremities add their contents to those of the intestinal lymphatics. It is quite as easy to believe that the transforming power required to form fibrin from albumen, resides in the highly organized tissue, as muscle; *aside* from the question of the albuminous or fibrinous nature of the plasma by which those tissues are nourished; and aside from that other but related question of the nutritive or excrementitious nature of fibrin.

In physiology, after due allowance for the presiding influence of "spirit," we have essentially to do with matter and force. It is extensively admitted that *force* is a unit—the apparent plurality of forces being a mere corollary of multiplicity of media by which the *one universal force of Nature* is made sensible to us. In cell-life, we call it "germ-force," or "cell-force." But this germ-force is limited. It must be renewed from without. In the vegetable organism, this supply is derived directly from the sun. Vital action is dependent on the solar forces. The fungi, and even the succulent roots of some plants, probably derive more of the required "force" from the earth itself—thus the products of cell-life become manifest to us in them. In the animal, which has neither leaves outspread to the sun, nor succulent attachment to Mother Earth, the *nervous system* is provided instead—as a reservoir and distributor of force, both solar and terrestrial.

Thus, then, the highly organized tissues, especially the muscular, in the cells of which, we have supposed, lies the force or power of transforming albumen into fibrin, are constantly provided with the necessary influx of new force, by way of *both animal and organic nerves*. Hence their superiority over the mesenteric lymphatics as assimilators of plasma.

Furthermore, Virchow shows us that the "proliferation of cells" is nutritive or progressive metamorphosis; and that proliferation implies the presence, not of albumen as such, not of fibrin as such—but of a substance intermediate in character—to wit, "lymph." That is to say, by fair inference, that albumen is imbibed by the cells of the tissue, there to be subjected to germ-force, constantly sustained by nervous currents—thus becoming lymph, and capable of still further transformation into "germinal matter" (Beale)—still further, taking the character of the plastic cell-wall ("formed material"—Beale)—which, by disintegration becomes—*fibrin*—yet to play the secondary but important rôle of giving what a painter would call "body" to the circulating fluid.

Time would fail us to trace hence the pathological inferences—as to irritation and inflammation and their nervous relations—as to morbid growths and their relation to retention of the *excrementitious fibrin* in local nutrition, as well as its excessive production under nerve-force, in such cases; and the *abortive suppuration* upon which such growths may locally depend, etc.

Dr. Stellwagen could not forbear in speaking upon this question, stating his most profound respect for the opinions and judgment of those who have espoused the original theory—and yet he felt that so far as he could understand them, the arguments of those regarding fibrin as effete material, seemed at present to explain the most of the phenomena connected with this animal principle.

To follow the arguments advanced by the opponents of the original theory, attention is invited to the very small amount of fibrin in comparison with the rest of the constituents of the blood as given in the approximate analysis of Professor Lehman. In 1000 parts of blood—

Fibrin	2·025	
Corpuscles including iron	149·485	
Albumen	39·420	
Fatty and extractive matters	5·285	
Mineral substances exclusive of iron	8·335	
		204·550
Water	795·450	795·450
*Total		1000·000

Thus amounting only to from 3 to 5 drachms in the whole weight of 18 or 19 lbs. of blood in the adult human being.

* According to Lecanu, and MM. Andral and Gavarret—

Fibrin	8	
Red corpuscles	127	
Solid matter of serum	80	
Water	790	
		1000

(*Dunglison's Med. Lexicon*, p. 189.)

The fibrin of muscle (musculin) is more nearly related to albumen than fibrin. In the healthy subject when by muscular exertion the tissues are more rapidly destroyed, there is an increase of this animal element in the blood, and *vice versa*, rest seems to lessen it relatively in quantity.

According to various experimenters, blood without fibrin is nourishing, and when injected into the veins of men or animals that have previously been deprived of life seems to overcome the rigor mortis, causing a return of the color to the skin, etc., etc. Animals almost dead have been so stimulated and nourished by it as to obtain a new lease on life —indeed, one instance is cited where a dead dog having had defibrinated blood injected, got up and wagged his tail, giving various evidences of life for 12 hours. In these experiments it seemed that the blood of the same animal served the purpose best; the main point, however, being to have the corpuscles about the same size, if obtained from different animals.

In cattle that have deteriorated by breeding in and in, to use an expression of breeders of stock, it is said that the fibrin is increased in quantity as the animals deteriorate in quality and *vice versa;* it is diminished by the judicious crossing, that is, taken advantage of to improve a breed.

If venesection is carried to fainting or anæmia, the relative amount of this constituent of the blood is increased.

Analysis of the blood of animals that have been in a state of starvation, shows an increased proportion of fibrin.

The assertion that fibrin is excrementitious, is based upon the experiments showing that the blood as it returns from the kidneys (purely excrementitious organs), by the renal veins, has no fibrin in it—the same of the contents of the hepatic veins.

Most secreting surfaces are said to have less fibrin in the blood supplied to them than the non-secreting.

In many diseases, as inflammations, etc., we find more than the normal amount of fibrin. To argue that it is as likely to be due to a want of power on the part of the tissues to take up the nutriment, as that it is in consequence of the increase of waste, seems objectionable— else how would it be in certain stages of starvation, where all the tissues may be said to be hungry and ready to seize with avidity upon almost any food?

The blood in healthy old age has an excess of the relative amount of fibrin found in that of healthy youth.

In the pregnant healthy woman whose histogenetic powers are fully called into play, there is less of this principle in the sanguineous fluid than when in the non-gravid state.

To conclude, it is believed by these theorists that the blood of the

fœtus or the contents of the egg (where the building or formative process is in the highest state of development) may be said to be free from fibrin, or at most to only have a trace in it, which, as cell death begins almost simultaneous with life, may be thus readily accounted for if present at all. It is possible that here musculin and fibrin have been confounded.

Some have attempted to account for this by assigning to fibrin a position similar to a ferment or leaven; but to this the answer may be made, ferments are now considered to be either plants or animals, and, after all, they do not build tissue, nor does the leaven form the loaf, but merely changes the dough.

The conclusion arrived at by these observers is that it is organic matter in the early stage of degeneration, that occurs in passing from life to death, the latter being accomplished by the change from a fluid to a solid.

It would be well here to mention the manner in which my friend, Prof. J. F. Flagg, of the Philadelphia Dental College, has taken a step to harmonize both of these theories by putting the question—May it not be that fibrin is a stage through which histogenetic material may twice pass, once before and once after it has performed its functions?

This substance is not without use, giving as it does body to the blood, and thus aiding in the economical actions of nature. Neither must the important action claimed for it in arresting hæmorrhage by coagulation, nor the prevention of pyohæmia by the formation of a barrier between pus and healthy tissue be overlooked when investigating its properties.

TO THE DENTAL PROFESSION.

CINCINNATI, NOV. 9, 1867.

THE position of the Dental Vulcanite question is such that we deem it proper to make this statement.

A suit was brought about a year ago, in the City of New York, by the Goodyear Dental Vulcanite Co. against Dr. T. G. Wait and others, for alleged infringement of the Goodyear rubber patents in the use of vulcanized rubber for dental purposes. About two months was consumed in taking testimony in the case of Dr. Wait, and in the early part of June last the case was argued before Judge Nelson in the U. S. Circuit Court for the Southern District of New York, by Mr. George T. Curtiss and S. D. Law, for Dr. Wait, and by others for the Rubber Company.

The argument was a clear, faithful, and strong presentation of the case, covering all the ground. The decision was not given till September, and when it did come was adverse to the defendant.

The dental profession in New York do not manifest an inclination to carry the case by appeal to the Supreme Court of the United States.

The question now occurs, with the profession of the West at least, What shall be done? Shall we consider this decision of Judge Nelson as a finality? or, Shall it go to the highest court for its decision?

As to the course that should be pursued in reference to this matter, the Executive Committee, who have been acting for the profession of the West, did not choose to take the responsibility to decide; and hence a call was recently issued for a meeting of the profession in this city on the 7th inst., that they might indicate to the committee their wish.

That meeting was held according to the call. Quite a number from distant parts of the West were present, each one delegated by and representing large numbers of his professional brethren. In that meeting, *after a thorough review of all that had been done; a full examination of the present standing of the matter in all its points and bearings; and an entire comprehension of both probable and possible future results*, the following resolution and request was unanimously adopted, and the hearty co-operation of the profession pledged for its carrying out:

Resolved, That we approve the course pursued by the Executive Committee and attorney who have been acting for the dental profession in the West, in contesting the claims of the "Goodyear Dental Vulcanite Co." against the profession, and that we request them to continue the defense to the ultimatum, believing that notwithstanding the decision of Judge Nelson in New York, the importance of the subject demands a full and final investigation by the highest tribunal in the courts.

We would urge upon the profession the necessity of sustaining the position indicated by the above resolution, by contributing the sinews of war to the defense, and witholding them from the prosecuting party.

It is a matter of regret that any dentists have been induced by threats and gross misrepresentation to contribute to the latter.

All who contribute for this defense will be sharers in its advantages if occasion requires.

We would further suggest, that in view of the course pursued by the agents of the Goodyear Dental Vulcanite Company, throughout the country, that it will be safe to regard the statements of the agents about the action of the Executive Committee, or their attorney, or in reference to the action of the courts, or even of their own company, either as false or so distorted as to give false impressions.

Committee { J. TAFT, A. BERRY, J. G. CAMERON—Cincinnati.
W. P. HORTON, L. BUFFETT—Cleveland.

The following resolution was adopted at a meeting of the Chicago Dentists, held Monday evening, November 11th, 1867:

Resolved, That the dental profession of Chicago approve the action of the Executive Committee of the Ohio State Dental Association, in de-

tending the suits pending between the Goodyear Dental Vulcanite Company and different members of the profession. And that we request them to continue their defense until a final decision of the Supreme Court of the United States at Washington has been obtained.

LEBANON VALLEY DENTAL ASSOCIATION.

BY S. H. GUILFORD, D D.S , LEBANON, PA.

A REGULAR meeting of the Lebanon Valley Dental Association was held at Reading, July 11, 1867.

Besides a good attendance of regular members, there were present as visitors, Drs. McCalla, Welchens, and Amer, of Lancaster, and Dr. S. T. Brown, of Frankfort-on-the-Main, Germany.

Drs. Lineaweaver and Moffitt were unanimously elected delegates to the American Dental Association.

Dr. Moffitt, the essayist for the evening, read a paper on "Aluminium Base." He spoke of the properties of the metal in its pure, as well as in its alloyed state, and of its recent introduction into the dental laboratory; and believed, from the experiments he had made with it, that it would not be long in superseding rubber as a base. He exhibited a partial set of teeth, mounted on aluminium, and specimens of the metal in different combinations.

By request of the Association, Dr. McCalla read a very interesting paper on "The relative liability of Teeth to decay;" his remarks being based upon a practice of many years, in which he had extracted ten thousand teeth for all causes.

Dr. Brown, of Germany (formerly of the United States), interested the Association for some time by giving, in a pleasant conversational style, an account of dentistry in Europe, their style, and standard of work, their prices, and modes of practice, and the difficulty of an American in obtaining "permission" to practice.

Dr. Lineaweaver was chosen essayist for the next meeting.

Adjourned to meet again at the call of the president.

CONNECTICUT VALLEY DENTAL ASSOCIATION.

THE fifth annual session of this association began at Haynes' Hotel, Springfield, Mass., with forty members present, from Vermont, Connecticut, and Massachusetts, and with Dr. L. D. Shepard, of Boston, in the chair. Dr. James McManus, of Hartford, was unanimously elected president for the ensuing year, but declined, and the following new board of officers was then chosen:

President.—Dr. A. A. Howland, of Barre.

Vice-Presidents.—Dr. O. R. Post, of Brattleboro'; Dr. A. B. Cowan, of Palmer.

Secretary.—Dr. W. H. Jones, of Northampton.

Treasurer.—Dr. A. F. Davenport, of North Adams.

Executive Committee.—Drs. J. S. Hurlbut and J. J. Anderson, of Springfield, and Dr. E. M. Goodrich, of Westfield.

The retiring president, Dr. L. D. Shepard, delivered the annual address, choosing for his subject "The use of the Mallet in consolidating the Gold in filling Teeth, with directions how to use it to secure the best results." To show the durability of filling when well done, he spoke of a patient whose mouth he recently examined, for whom Dr. Joshua Tucker, of Boston, filled fifteen cavities in 1834, and all but one were as good as when put in thirty-three years ago. Dr. Shepard urged upon the members great care in all operations, saying that most failures were the result of haste and carelessness. He exhibited plaster casts of teeth before and after filling, showing what could be done with the mallet and adhesive gold in filling badly decayed and broken teeth, and restoring them to their original shape.

In the evening the treatment of "Sensitive Dentine," and the proper material to use to avoid pain in cleaning out sensitive cavities, was discussed.—*Republican.*

EAST TENNESSEE DENTAL ASSOCIATION.

BY S. H. SMITH, KNOXVILLE, TENN.

On the third Thursday of October last, a number of dentists, from different parts of East Tennessee, met at the office of Dr. J. Fouche, in Knoxville, for the purpose of organizing an association. At a preliminary meeting, held some weeks previously, a committee had been appointed to draft a constitution to be presented at this meeting.

The chairman, Dr. Carsen, called the meeting to order.

Dr. W. H. Cooke, of Cleveland, presented a constitution, which, after considerable discussion, was adopted.

An election of officers resulted in choosing Dr. J. Fouche, of Knoxville, President; Dr. W. H. Cooke, of Cleveland, Recording Secretary and Treasurer; and Dr. S. H. Smith, of Knoxville, Corresponding Secretary.

The annual meetings will be held at Knoxville on the third Wednesday of October. Two other meetings in the year are provided for. This year they will be held on the third Wednesday of March, at Cleveland, and the third Wednesday of June at Morristown.

Such an organization has been long needed in East Tennessee. It is only necessary that the profession in East Tennessee sustain it to make it of very great advantage to themselves and the community.

WASHINGTON CITY DENTAL ASSOCIATION.

BY H. B. NOBLE, D.D.S., WASHINGTON, D. C.

THIS Society held its annual meeting Monday, December 2d. The following officers were elected for the ensuing year:

President.—Dr. R. F. Hunt.

Vice-President.—Dr. O. A. Dailey.

Secretary.—Dr. H. B. Noble.

Treasurer.—Samuel Lewis.

Librarian.—Dr. H. N. Wadsworth.

Executive Committee.—Drs. H. N. Wadsworth, T. O. Hill, H. B. Noble.

The Association has been in active operation the past year, holding meetings on the first Monday evening of each month for the discussion of subjects and the interchange of experiences. Dentists visiting the capital are invited to meet with us.

ST. LOUIS ODONTOLOGICAL SOCIETY.

BY E. S. ULMAN, D.D.S.

AT the late annual meeting of the Odontological Society of St. Louis, Mo., the following officers were elected for the ensuing year:

President.—G. W. Trauernicht, D.D.S.

Vice-President.—C. W. Gill, D.D.S.

Recording Secretary.—Alex. Dienst, D.D.S.

Corresponding Secretary.—E. S. Ulman, D.D.S.

Treasurer.—Jos. Payne, D.D.S.

DENTAL ASSOCIATION OF ONTARIO, CANADA.

THE next session of the above association will be held in Toronto, to commence on the third Tuesday in January, 1868, at 7 o'clock P.M.

J. S. SCOTT, M.D., *Recording Secretary.*

EDITORIAL.

STAR RUBBER.

THE Boston Belting Company, manufacturers of the "Star Rubber," and generally understood to be chiefly governed by the same gentlemen that own the stock and control the affairs of the Dental Vulcanite Company,* which is threatening suits against dentists all over the land, have by circular informed the profession of a reduction of 50 per cent. in the

* Henry F. Durant, Esq. (a lawyer), is President of both companies.

price of their rubber, and express their "desire to place it in the hands of every dentist."

Any one who chooses can avail himself of this opportunity of dealing directly with the company, and thus furnish them a record of the amount of rubber used by him, thereby enabling them to accumulate valuable data, as evidence against himself, to be employed at their convenience in instituting suits.

"Will you walk into my parlor?
Said the spider to the fly."

J. H. McQ.

PUBLISHER'S NOTICE.

The short volume of five numbers having been completed with the December number, we begin the year and the Tenth Volume of the Dental Cosmos with this issue. We desire and expect an increase in our subscription list, and earnestly request those who wish to renew their subscriptions, or to enter as new subscribers, to send us their names and the amount of subscription without delay, in order that we may determine the number of copies to print.

We have had a sufficient number of copies of this issue printed to meet any probable demand, but shall hereafter limit the number to the subscription list.

PHOTOMICROGRAPHS.

Through the politeness of my friend, Brevet Lieut.-Col. J. J. Woodward, Assist.-Surg. U. S. A. (who is engaged in writing the Medical History of the War, by appointment of the Surgeon-General, on account of his peculiar fitness for the duty, as a man of marked ability, extended scientific attainments, and executive power), I received, during the past week, from the Army Medical Museum, in Washington, a number of valuable photomicrographs, of various organic structures, prepared by Brevet Major Ed. Curtis, Assist.-Surg. U. S. A. The execution of these admirable specimens is deserving of the highest meed of praise, and has commanded the unqualified commendation of gentlemen in Europe and America, who have devoted considerable time and attention to this matter, and accomplished valuable results therein. Two of the specimens represent the *Pleurosigma Angulatum* with the spaces round in place of hexagonal, as described and figured by Carpenter.*

The faithful manner in which the minute character of the structures in the field of the microscope is presented, demonstrates the value of photomicrography for class instruction. The difficulties attendant upon

* Carpenter on the Microscope, p. 282.

the exhibition of objects under the microscope, to classes of any size, renders the use of that instrument exceedingly limited, except when employing the horizontal microscope of Dr. Beale, which can be passed from hand to hand. The use of this, however, is attended with a certain amount of difficulty, and the substitution of accurate photomicrographs would prove invaluable not only for that purpose, but also in the illustration of scientific works. Some years ago I endeavored to interest a friend of mine, a gentleman of leisure and fortune, who is quite a superior amateur photographist, in the taking of photomicrographs of the dental tissues, but was unsuccessful. Another, who has devoted some attention in this direction, has, however, volunteered to take the matter in hand, and no doubt satisfactory results will be secured by him.

Photomicrographs prepared for the magic-lantern are still more valuable in demonstrating the minute structure of different organic tissues to large classes of students, and this plan has been tried with marked advantage by Prof. Draper, of New York. J. H. McQ.

PHYSIOLOGICAL ANATOMY AND PHYSIOLOGY OF MAN.

A COURSE of lectures on this important department of science is now being delivered before the Society of Dental Surgeons in the City of New York, by PROF. RUFUS KING BROWNE, a gentleman who has devoted years of study to this subject in the best schools of our own country, England, France, and Germany. His intimate acquaintance with the subject, gained as a student and teacher, combined with his excellent powers of description, through which his subjects will not only be made instructive, but attractive, cannot but prove of decided advantage to his auditory, and teach them that, valuable and important as a thorough knowledge of the physiology and pathology of the teeth is to the practitioner of dentistry, such knowledge can only be truly gained by an extended acquaintance with the anatomy and physiology of man. In other words, by becoming familiar with the entire organism, they will properly appreciate the exact relation which one part bears to another, or the economy at large. In addition to this course of lectures, the society has established a section for the study of questions in DENTAL HISTOLOGY. J. H. McQ.

BOSTON SCHOOL OF MEDICAL SCIENCE.

A CIRCULAR has been received from Prof. Horatio R. Storer, announcing the establishment of the above-named institution, which has been organized by a number of gentlemen, who have associated themselves together for the purpose of giving instruction in their respective departments to advanced students and to physicians who may be de-

sirous of fitting themselves for special practice. There are twelve departments, each devoted exclusively to the instruction of a single specialty; among these, one is devoted to the diseases of the teeth, under a lectureship filled by T. B. Hitchcock, M.D. "The course of lectures will be delivered during the winter term of the Medical College, at such hours as will not interfere with the collegiate curriculum; during the summer session it is intended, with the assistance of additional instructors, to cover the whole range of legitimate specialties." The object of the institution is to afford all the facilities sought after by American medical students in Europe in special lines of study. It is to be hoped that it will meet with liberal support. J. H. McQ.

TO OUR CONTRIBUTORS.

Entering, as the Dental Cosmos now does, on the Tenth Volume, the editor of this department feels it incumbent upon him to say, that in the past he has been under the necessity on various occasions to decline the publication of articles forwarded to him for that purpose. Some of these, although ably written, have been irrelevant to the objects of the magazine; while others have been so faulty in their construction, that a proper regard not only for the reputation of the magazine but for the authors, precluded the possibility of publishing them. In returning such communications, the reasons for doing so have been couched in language which it was hoped would prevent any unpleasant feeling; and in the majority of instances it is believed with success. In a few cases, however, the result apparently has not been so fortunate —the parties evidently feeling that they had been slighted or wronged. To such it may be said that an editor is compelled to consult the wants of the many rather than the wishes of the few, and that no considerations of friendship should interfere with a faithful performance of his duty, and that above all things he should be independent of fear or favor. J. H. McQ.

BIBLIOGRAPHICAL.

Register Papers: A Collection of Chemical Essays in Reference to Dental Surgery. By Geo. Watt, M.D., D.D.S., Prof. of Pathology and Therapeutics, late Prof. of Chemistry and Metallurgy in the Ohio College of Dental Surgery, etc. etc. Philadelphia: Published by S. S. White, 1868.

As the title of this work indicates, it consists of a series of essays prepared for and originally published in the *Dental Register of the West.* Making as the majority of the papers do direct and practical application of chemistry to the needs of the dental practitioner, they

cannot but prove of advantage to the profession. Some of the papers were published several years ago, and will therefore be new to many who have entered upon practice since they appeared in the *Register*. Among a number of these, and without detracting from the merit of others, attention may be directed in particular to "*The Action of Topical Remedies*" as an ably written article, imparting valuable information in a direction of such importance, that this essay alone should be sufficient to secure an extensive demand for the book on the part of the members of the profession. The mechanical execution of the work, the paper, typography, etc., has been performed in a neat and satisfactory manner. J. H. McQ.

THE DENTAL RECORD AND LEDGER. By W. H. EAMES, D.D.S. Published by A. M. Leslie & Co., St. Louis, Mo.

A copy of this book has been received from Dr. Eames. It has been gotten up in an excellent manner, and is well adapted for the purpose which the name fully indicates, of recording the operations performed each day, and crediting the amounts received. J. H. McQ.

CORRESPONDENCE.

THE RUBBER QUESTION.

TO THE EDITOR OF THE DENTAL COSMOS:

THINKING that in these times of excitement in reference to the rubber question, any facts which will throw light on the modus operandi of the Boston Dental Vulcanite Company will be interesting to the profession, we submit the following:

About a year ago, being in Boston, and feeling a natural curiosity in reference to all matters relative to dentistry, we called at the works of the Boston Belting Company, by whom the star gum is manufactured.

In talking with the superintendent, he incidentally informed us that the Boston Belting Company and the Boston Dental Vulcanite Company were *the same*, or that they were interested in common to get all they could from the dentists. This did not seem of much importance at the time, except that it was the height of folly to buy gum of the *same* company which was prosecuting the profession, because it was putting money into the hands of the company with which to continue the suits.

Now, however, this information does become important, when the Boston Belting Company offer to sell their gum to the dentists at $2 per pound, and request the dentists to send directly to them for it.

The design is obvious—namely, to get the names of the dentists, and

then to get orders directly from them. This is done under the cover of a reduction in price.

After the company has received an order from a dentist for even a single pound of gum, it is strong presumptive evidence, to say the least, that he is vulcanizing rubber, and some fine morning the company's agent will call at his office with all necessary information and ask for a settlement.

The profession ought to understand that they are dealing with shrewd men, and that it is better to pass by this tempting bait of a reduction in price, even at some temporary sacrifice, than to give information which will *certainly* be used against them. "A word to the wise is sufficient."

R. S. W.

THE AWARDS AT THE PARIS EXPOSITION.

To the Editor of the Dental Cosmos:

My attention has been called to a communication which appeared in the *Dental Quarterly* for September, over the signature of R. L. C., dated Paris, July 10th, in which certain statements appear in reference to the Exposition Universelle, and the awards made, especially those referring to artificial teeth.

The writer impugns the integrity and fairness of the committee, and then with a strange inconsistency congratulates a firm who received a *bronze medal*, as "the only party that received a medal exclusively for artificial teeth," and to whom such a recognition must be especially gratifying, "as it is an award for merit and not display of money," thus coarsely intimating bribery and corruption.

The only member of the committee from the United States, Dr. Thomas W. Evans, is mentioned by name, and a vulgar effort made to cast discredit upon him. His well-earned reputation is in no danger from the unsupported innuendos of an anonymous correspondent, and it is not for the purpose of defending him that I trespass upon your pages. The statement to which I feel impelled to reply, and to pronounce false, is that in reference to the awards. The fact is, that Samuel S. White received the first premium, a gold medal (the highest award given to any one in that class), and his name, as appears by the official report, is first on the list; not for "a large display," but for the best artificial teeth on exhibition.

Having been in Paris during the exhibition, and being perfectly familiar with the views as well as with the report of the committee, it seemed to me a duty to the profession, as well as to the manufacturer named, to make this statement of facts.

Horace Enos, D.D.S.

Philadelphia, December 12, 1867.

PERISCOPE OF MEDICAL AND GENERAL SCIENCE IN THEIR RELATIONS TO DENTISTRY.

BY GEO. J. ZIEGLER, M.D.

"*On Caloric the Form of Force in Nervous Matter.* By BENJAMIN W. RICHARDSON, M.D., F.R.S., Senior Physician to the Royal Infirmary for Diseases of the Chest.—The next point which calls for special remark relates to the nature of the force with which the nervous matter is supplied. This subject has occupied the minds of the first of the thinkers of the world, and I know of no subject more absorbing or more wonderful. The experiments of Galvani and Aldini on the influence of electrical action on muscular motion through nerve led, in the early part of this century, nearly all the physiological world to the belief that in the natural nervous system electrical force is developed, and that the nerve cords from the centres are the veritable conductors of electric currents. To this day the same view has been maintained with much persistency, and various analogies have been set up between brain force and that form of electrical force called galvanism—analogies, as I humbly think, having no real foundation in fact. In the year 1860, in the course of Lettsomian lectures 'On Certain of the Phenomena of Life,' I ventured to oppose some of these views, and to maintain that in the animal body there was no arrangement for the generation or liberation of any variety of force except caloric. I knew then none of the very singular experiments with cold which we have seen at the last as well as at the former lecture, but I reasoned that there was only one process in the organism for the production of animal force, and that this force, generated, or rather set free, in the combustion of blood, was an active force in every structure. Proceeding from the general to the particular, I laid down as a proposition that caloric is the primary cause of motion in nature, and is therefore a primary cause of life, in so far as motion represents life. To illustrate the position thus assumed, I was at that time compelled to resort to less direct modes of illustration than at this moment are necessary. I looked at the sun as, by the universal voice of mankind, the prime source of all living power, and I contended that the force by which he manifests himself throughout the living world is the force which in its effects, as sensible effects, we call heat, and which in all its characters, whether sensible, latent, or specific, we include under the more comprehensive term *caloric*.

"I said that every observation we make in our natural lives leads to these inferences. We measure the amount of life, animal or vegetable, throughout the universe; and we learn that the proportion of life and of motion goes with the heating power of the central luminary. From the extreme pole to the burning equator, the eye glances in the imagination of absolute knowledge; and as each degree passes under review from the sterile centres of thick-ribbed ice to the intensified summers of the tropical gardens, we see the gradational life increasing until it reaches the maximum of luxuriance, and that stage of rapid growth and decay, when life and death play into each other with such force, that the one is, I had almost said, lost in the other; and viewing the scene, philosopher and simplest observer each says, 'these are the effects of heat.'

We turn from this grand panoramic picture to our own smaller doings, and we find ourselves instinctively summoning into play a force to supplement nature—our designs are successful. We bathe our bodies in the rays of the fire when the sun retires, and we live. We wish our flowers to grow, and our fruits to run to maturity before their seasons, that our tastes may be satisfied; we make a furnace in our gardens, and our object is gained; we know here that the sensible caloric, the heat we have elicited, is the supplement of the sun. We enter into the laboratory, and we desire there to tear matter into fragments, or to conjoin materials which before were fragmentary. We dissipate solids into gases, and weld the fragmentary metal into a huge mass, an arch for a bridge, or a battery for war; and again we do it all (for we could not move a step otherwise), we do it all by the agency of caloric. We diffuse this agent through expansible water, and give to every cubic inch the dimensions of a cubic foot; the full expansion gained, we extract this expanding agent, condense the water to its original size, and by the alternation generate motion, thus imitating the great winds which, expanded in the equator, condense toward the pole, and in perpetual circuit make their way; and thus likewise imitating the gentle rain, which, distilled from the earth into the colder regions of space, condenses there and returns to its resting-place in liquid drops.

"We thus see in this caloric a great agent, possessing all the attributes by which the varying and yet universal properties of all matter are developed.

"It is observable that in natural thought we never dream of attributing the changes noticed to any other force than caloric. It is only when we enter into philosophical subtleties that we begin to hear of other and correlative forces, as primary to caloric or substitutional for it. When, again, we turn to these profounder though probably not safer contemplations, we learn with equal sense of truth that, after all, caloric is the primary force—the first and last in action, and the universal in presence and production.

"Carrying out the argument further in its especial application to living beings, I added what follows:

"'Limbs are flexible and movable at 96 degrees of heat. If this temperature be reduced a few degrees, the muscles become painfully contracted; if the reduction be made further, the muscles become rigid; but they are relaxed by gentle warmth, and the motion is restored.

"'In the animal world, I see different animals of different degrees of motive power and endurance. Examining their construction, I find as an unvarying law that the strength or the power of motion is in exact relationship to the power of the animal to eliminate and apply caloric.

"'I see an animal at rest, and I notice that he converts a certain weight of carbon into carbonic acid, and liberates a certain proportion of water. I see this animal in active motion—a horse galloping with his rider, every muscle in full action; and now he pours out a greater measure of carbonic acid and volumes of visible vapor of water. Between the steam evolved by this animal and the steam evolved by a locomotive, will any one define to me the difference in relation either to cause or to effect? I mean, of course, in relation to the physical differences; for with the metaphysical I have nothing to do.

"'In so far, then, as motion represents life, caloric is the source of living motion. It may undergo modifications in character; now being

latent, now sensible; now being rapidly conducted through metals, or other conducting media; now rapidly evolved in series of concentrate sparks. We may call it in these varied forms by other names—*electrical force*—*galvanic force*—but it is the alpha and omega of them all —the principle of motion.'

"Lastly, in connection with this universality of distribution of animal force, I inferred its unity in the animal organs, conceiving the active healthy living structures to be all stored, as it were, with force. Thus I showed 'that, whenever muscular action is called into play by interference with the nervous cords, whether in the branches or in the spinal trunk itself, the excitation produces its effects by interference with the nervous column at the part irritated; not by propagation of a current through the nerve-trunk leading from the excited part to the deranged muscle. For instance, when I passed a continuous current through a portion of the spinal cord of an animal, I for the time produced a paralysis of the muscles which immediately communicate with that section of the cord; but that this is not an effect produced by a transmitted current to the muscles was proved by the fact that, by galvanizing the nerves between the cord and the muscles, I could cause contraction of those muscles.'

"According to the view I then held, I also inferred from all the phenomena observed that the nervous system is in every part a producer of the peculiar force with which it is endowed; not that the brain or ganglia are special producers; not that a current from these centres, intermittent or continuous, is traversing the nerve-fibre; but that the nerve-structure, so long as it is supplied with blood, is producing the force wherever there is nervous filament. I looked on the vast area of nerve-fibre in the peripheral surface, and I saw in it a mass equal to that of the brain; I saw this mass supplied with blood everywhere, and built always on the same plan. I assigned to it everywhere the same purpose and labor.

"In this way I was led to look on the muscular system as an entire independency, and on the nervous system also as an entire independency. The muscular system, nourished by blood and charged with caloric as caloric; the nervous system, nourished everywhere by blood, and charged also with caloric in its electrical modification; each independent systems. We conjoin the systems, and the result of their equilibrium is a simple passive state, while the result of a disturbance of their equilibrium is motion and sensation.

"Thus, I reasoned, 'as every portion of nerve down to the minutest branch possesses producing power, the mass of the force generated is so universally distributed, that interference in any part of the nervous communications is reflected to the whole nervous system. So when our distinguished brother, Dr. Brown-Séquard, produces artificial epilepsy, and induces the paroxysm by irritation of some particular external point of nerve, he does, in fact, in that irritation touch at one presenting point the universal fluid pervading the whole body of his subject, and excites, not by special transmission, but by general disturbance of the equilibrium of the forces, a convulsion through the whole muscular organism. So, when with the intermittent current I galvanize a portion of the nervous tract, I produce convulsion, because I induce an alternation of force; at one moment allowing the natural equilibrium to establish itself; at the next moment disturbing it. So, when I continue the current with-

out intermission, I virtually cut off altogether the included nervous tract from its system and cause paralysis of will, because I have cut off also communication with the brain; but I can, nevertheless, call into play at pleasure the excitability of the nerve-trunks below, as long as they continue to summon into their service blood for their nourishment and force-producing faculty.

"If it were possible to entirely remove from the body every muscular fibre, and, leaving the nervous system entire, still to supply that system with blood and surround it with those conditions under which its blood could be applied, that nervous system would exist as motionless intelligence. It might think, feel, and by virtue of its sensual organs appreciate and know the external world surrounding it; yet be incapable alike of act or of expression. On the other hand, if every particle of nerve-matter could be removed, the muscular system being left with its attachments to bone still secure, and its blood-current free; that muscular system would remain an unintelligential mechanism, having in itself its *vis insita*, but being incapable of exerting movement until brought into action and guided by the intelligential part of a more perfect animal.

"By the combination of the two systems in the perfect organism we obtain, so long as the necessary conditions for life are supplied, the doubly endowed and self-acting body. An excitation of light refracted on the nervous expanse of the retina touches the pervading force, and the animal sees; but this light must be presented to the nerve-expanse, or, in other words, to the force that pervades the expanse, in such a way that the absolute physical picture shall be put upon it, or the picture will not be seen. It is not that the picture is to be carried to the brain, but that it is to be looked on at this point of the nervous expanse by the presiding force. A vibration is set up in a mere physical membrane, spread above another distribution of nerves, and the animal hears; it is not that anything is conveyed specially to the brain, but that the equilibrium of the pervading force is disturbed. An impression is made on the skin, and the animal feels; it is not that any current is conveyed to the brain, but that the impression disturbs the balance of the nerve-fluid throughout its universality. The impression made is slight, and it is pleasant, or not painful; it is severe, and it excites the whole animal body, so that the body writhes in agony, and may even die from the reflection of the impression upon the muscular fibre, and the resultant spasm.'

"The views expressed above, at the time when they were first enunciated, were based confessedly on general inferences. They were not sufficiently exact to satisfy the demands of strict science, and for that reason they were never unduly pressed on the attention of the profession. At the same time they were, in the main, correct, and now, somewhat simplified, they stand firmly, I believe, on fair and rigid experiment.

"For what are the facts which have here experimentally been brought to our notice? We have had before us a frog; we deprived it of all sensibility; we deprived it of all power of motion. How did we effect this? Simply and solely by the abstraction of the heat from its cerebro-spinal system. When the animal was thus reduced to inertia—when to all appearance it was dead—we saw its life fully restored. In what manner, under what condition, did this restoration become pronounced?

There was only one condition—restoration of caloric. When we put these two great facts together, and when we couple them with the further fact that the animal has no means for producing any force except calorific force, we cannot, I think, escape the conclusion that animal force is caloric. With this we may admit—indeed, we must admit—that other correlatives, when brought to bear on the living body, can stir into temporary motion the organic structures; we must admit that light can set up motion from the eye to the brain; that the passage of an electric current can set up motion in muscle, and motion from any periphery of nerve to brain; that the vibration of air can convey motion by the ear to the sensorium, and that the motion of minute particles of organic matter may be communicated through the olfactory nerves back to the centres of those nerves. But these admissions do not interfere with the general truth that caloric is *the* force of life—that it is true and sufficient to explain all the phenomena of living motion.

"Before this curious experiment of producing inertia in a living animal by abstracting the caloric from its nervous centres, is allowed to pass from our thoughts, let me make one more reflection respecting it. The inert animal is either asleep, or it is dead. The terms sleep and death are. I know, relative, but as we must be guided by them, and as we know the animal can be restored, we are bound to say of it that it is not dead, but that it is as we are, when we are shut out, for a time, from the world—asleep. We let back then the force that has been taken away; as the force goes back, it loosens the hardened tissues, it enters the structures; it enters the nervous centres, it recharges them, and thereupon there is renewed motion. We learn, thus, that when these nerve-centres are reduced in force there is a powerless organism; we learn that so reduced the centres can again take up and again lay up force; we gather the truth that when the centres are once more replete with force they communicate the fact to the rest of the organs, and that the body therewith awakes. Of what is this the counterpart? I think it to be the counterpart of natural sleep. I take it that during sleep the exhausted brain, the exhausted nerve-cord, the exhausted nervous system, everywhere takes up and stores up caloric, and so continues to take up and store up until it is charged to its full capacity. Then, if I may use such expression, it overflows with force, it spontaneously fills the body, and there is presented that phenomenon of motion which we call 'the awakening.' Send other force, vibration from noise or mechanical motion, at any moment through a sleeping body, and you may, through a dynamic act, excite motion, and the body may awake; but by this you have not primed the body with the force it wants for sustained work; you passed a charge of force through it, but you did not charge it. So when my unwound watch is ceasing, I can stimulate it into movement for a moment or so by a moderate blow or shake; but the force is applied uselessly if the mainspring be not recharged.

"The phenomenon of sleep and the phenomenon of awaking from sleep appear thus to me to have a simple and a rational explanation—an explanation purely physical in character, and which may be applied to the correct exposition of many of the phenomena of disease as well as of health."—(*Medical Times and Gazette.*)

Secretion of Parotid Glands.—"Prof. Mosler, of Berlin, has made a very interesting series of experiments upon the *secretion of the*

parotid glands, employing the method of Eckard, which consists in introducing a sound one millimetre ($\frac{1}{25}$th inch) in diameter, by means of a mandrel, into the canal of Stenon. Ordinarily the catheter or sound remains in place for a sufficient period of time, and even should it fall out, it can be replaced by one somewhat larger. This method, excellent for qualitative experiments with the parotid saliva, is not certain for quantitative experiments; because more or less of the saliva flowing along and outside of the canula is lost in the mouth. In order to have a large amount of the saliva in a short time, Mosler slightly irritates the buccal mucous membrane with diluted vinegar, or even by means of electricity. According to Ruhn, the saliva of the parotids is always alkaline, very fluid, does not draw out into filaments, and is without organized parts. An acid reaction and some epithelial cells are only found in the first drops following the application of the canula; and the first of these phenomena is due to decomposition of detached epithelial cells. Upon boiling the saliva a part of its albumen is precipitated, while the rest remains in solution in the alkaline liquid. The saliva of the parotids contains no mucin, and the presence of rhodankalium and rhodannatrium (chlorate of potassa, and chlorate of sodium?) is not constant. The specific gravity varies from 1·0031 to 1·0043; the proportion of solids in from 0·570 to 0·616 per cent. It is only with man that the saliva converts starch into sugar. Mosler has examined the saliva in diabetes, and has never found any sugar in it, and even the general saliva of the mouth presents no trace of it. At the commencement of diabetes, the parotidean saliva is alkaline or neutral, and does not irritate the buccal mucous membrane; on the contrary, at a late period, and in acute cases, it becomes slightly acid, producing with many invalids an acid taste; then the teeth become carious and laid bare, the gums redden, tumefy, and even ulcerate. Alkaline gargles are then indicated and have a good effect. Mosler has also examined the saliva in three cases of icterus, and found in it neither bilic acid nor coloring matter of bile. In mercurial stomatitis, he believes he has ascertained that the inflammation of the buccal cavity as mechanically produced when the mercury, excreted by the parotid gland, has acted for some time upon the mucous membrane, and he is certain that inflammation precedes salivation, which is nothing but a secondary and reflex effect; at least he has found that emollients and demulcents, as opiated gargles, inhalation of hot vapors, etc., contribute very rapidly to arrest the salivation.

"In febrile diseases, the parotidean liquor is often acid, and, admitting with Virchow that the parotidity of typhus is produced by the extension of the affection of the buccal mucous membrane along the salivary ducts, by catarrhal obstruction of these and by the retention of saliva, the same observer has tried catheterism of the duct of Steno in these cases, and has noticed that, even when the parotid gland was already considerably tumefied, the discharge of a very acid saliva has been followed by a diminution in the size of the gland. In all cases, then, this attempt is worthy imitation."—(*L'Union Medicale* and *E. Med. Jour.*)

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"*Sulphuric Acid formed by Mollusk.*—MM. S. De Lucca and P. Panceri state, in 'Comptes Rendus' (1867, No. 14), that the salivary organs of the *Dolium galea* secrete a fluid which contains more than

three per cent. of sulphuric acid. They examined two specimens caught in the Gulf of Pozzuoles. When filled with liquid, the glands, two in number, are larger than ordinary fowls' eggs, and weigh about seventy grammes. They are formed of two distinct parts, one small and opaque, close to the excretory orifice of the gland, the other large and transparent, the membrane enveloping it being very thin and white. When incisions are made, so that the lower part of the gland comes in contact with the air, gaseous bubbles of pure carbonic acid are disengaged from the *cul-de-sac* tubes, of which almost all the gland is composed. A gland weighing seventy-five grammes discharged under water 200 cubic centimetres of carbonic acid. The liquid contained in the gland tastes like lemon-juice, acts on marble, and changes the color of litmus. A series of experiments show it to contain sulphuric acid. It was previously known that the *Dolium galea* ejected an acid liquid from its mouth which effervesced with carbonates, and when analyzed by M. Bædeker, gave 2·7 per cent. of sulphuric acid. The authors of the paper state that they will continue their researches with a view to discover how the sulphuric acid is produced, and what function it performs in the economy of the animal. They say this *Dolium* 'is the first animal which they knew of capable of making sulphuric acid by an unknown process.'"—(*Intellectual Observer.*)

Obscure Surgical Diseases of the Face.—MR. SPENCER WATSON read a paper on this subject before the Medical Society of London. "The paper consisted of a review of a number of cases in illustration of the difficulty of diagnosis—1st, of diseases of the deeper structures, such as the orbit, antrum, and jaw; 2dly, of those of the superficial parts. Among diseases of the orbit, abscess connected with disease of the bones, and involving cerebral meningitis as its ultimate consequence—solid tumors and simple malignant growths—were shown to give rise to very similar distortion of the features, and to have been mistaken for different diseases by some of the most eminent surgeons. Abscesses and diseases of the antrum were then reviewed, and cases cited in which solid tumors were complicated by abscess of this cavity, and in which the presence of purulent discharge was only accidental. In another case, the superficial character of the swelling for some time resembled a solid growth, but ultimately terminated as an abscess connected with necrosis. The means of discriminating between the various forms of swelling of the superficial parts of the face resembling erysipelas were then pointed out; and a series of cases of ulcers of the face originating from syphilis were given, in all of which there was for a time some obscurity as to their origin, but in which the progress ultimately cleared up the history. In two cases the swelling had so far resembled solid tumors as to make the surgeon propose their removal by the knife. The paper was illustrated by preparations, drawings, and photographs."—(*Lancet.*)

"*Syphilitic Affection of the Tongue.* (Service of Dr. Stephen Smith, Bellevue Hospital. Dr. Albert Strang, House Surgeon.)—C. S., a native of Ireland, aged 44 years, and a tailor by occupation, was admitted to hospital October 31, 1867. The patient is pale and somewhat emaciated. He states that some twelve years ago he contracted a sore upon the penis, which was followed after several weeks by the appear-

ance of an eruption upon the forehead and the front part of the chest. He placed himself under the care of a physician, but medication was discontinued as soon as the eruption disappeared. From that time until last March he suffered no inconvenience, having had no return of the disease. In March, however, he began to be troubled with severe pain in the gums, which he supposed to be toothache, and gradually the teeth upon the lower jaw became loosened and all of them were lost. In May the right half of the tongue began to swell and feel hard and stiff, its surface being thrown into elevations of the size of an almond, but smooth and covered with epithelium. At present the tongue is indurated and is so firmly bound to the floor of the buccal cavity as to make articulation very imperfect. There are two ulcerations, one situated on the tongue and one upon the inner aspect of the lower lip. Upon the chin are several tumors as large as a walnut, smooth, and of a bluish-purple color. They give no fluctuation and suggest the presence of gummata.

"The character of the pain is described as being a burning or soreness, it has never been lancinating.

"The patient is improving under the iodide of potassium and tonics."—(*Med. Gazette.*)

"*Excision of Inferior Dental Nerve for Neuralgia.* (Surgical clinic of PROF. GROSS, Jefferson Medical College. Reported by Dr. Napheys.)—A. B., aged 64. This man has been suffering from the most atrocious neuralgic pain for three years. His suffering has been so great as scarcely to be tolerated. The pain begins usually in the lower jaw, at a point opposite the mental foramen, whence it passes up into the cheek, and thence into the temple, where it seems to explode. Twelve days ago, when he called to see Prof. Gross, he could hardly articulate without great agony. He was put upon large doses of quinia at bedtime, ten grains, with one-third of a grain of morphine, and was ordered three times a day a pill containing

Quiniæ sulphatis,	gr. ij;
Acidi arseniosi,	gr. 1-20;
Strychniæ,	gr. 1-20;
Ext. aconiti,	gr. ½.

"Under this treatment the pain has been somewhat subdued, but not eradicated.

"He was put under the influence of chloroform, four holes made into the lower jaw-bone by means of the trephine, and about two and a quarter inches of the dental nerve removed."—(*Med. and Surg. Rep.*)

"*Excision of Inferior Dental Nerve for Neuralgia.*—A. B. This man was operated on nearly five months ago (*vide* vol. xvii. p. 99), on account of neuralgia, from which he had suffered violently for three years. Four holes were bored into the lower jaw by means of the trephine, and about two and a quarter inches of the inferior dental nerve removed, with the effect of giving him prompt relief. He had some pain afterward, but it was not comparable in severity to that which he had previous to the operation; in a short time it subsided, and he has been entirely free from pain to the present day."—(*Ibid.*)

Hypodermic Injection of Morphia.—In a discussion before the Royal Medical and Chirurgical Society on this subject (*Med. Times and Gaz.*),

"Dr. C. J. B. Williams confirmed Mr. Moore as to the fatal effects of morphia when given to a patient having albuminous urine; in one case one-third of a grain proved fatal. The injection of morphia was of peculiar value; it was like giving a new instrument to the profession. The complete effect was wonderful, it being tantamount to introducing a substance into the blood. In inflammatory toothache, a little morphia injected at the angle of the jaw completely relieved the pain. In the inflammation of membranes, again, the pleura, the peritoneum, and in rheumatism, the injection of morphia was likely to do much good."

Inoculation of Morbid Matter.—"Dr. Jaccoud, in the name of Professor Lebert, of Breslau, read a paper at the International Medical Congress of Paris (*Ibid.*) on the results of inoculation as applied to pneumonia, chronic adenitis, tubercle, and other morbid substances. The author states that he has produced tubercle in the lungs and the liver by injecting pus into the veins; and that, by introducing the sputa of tubercular patients under the skin of dogs, he has produced septicemia, or purulent infection. After relating several other experiments of the same nature, the professor states that the inoculation of various morbid substances appears to lead ultimately to the same results, and attributes the development of tubercle to a peculiar mode of cellular irritation."

"*The Human Bite Poisonous.*—A singular occurrence has just happened at Arth, in France. A Lieutenant Felchin was some time back bitten in the thumb by a man named Muller, but he thought nothing of the wound and went next day a journey on his private affairs. On reaching the Balse he found his hand and arm began to swell, and a medical man declared that the case was one of poisoning from a human bite. He at once returned home in haste, but he refused to have the arm amputated. The consequence was that the inflammation increased frightfully, and he died some days after in horrible suffering. May not the system have been at fault?"—(*Am. Journ. Med. Sci.* and *Jour. Mat. Medica.*)

"*Operation to Restore the Outline of the Mouth.* (Clinic of Prof. E. H. Gregory, of the St. Louis (Sisters') Hospital. Reported by T. Fox.)—A woman presented herself at the clinic, having a want of prominence of the angle of the mouth rendering her unable to retain her saliva, which was the result of a dense cicatrix of the left cheek, which extended from the inner angle of the eye downward to the level of the os hyoides, and across the medium line of the chin to the right angle of the mouth. This woman had on several previous occasions applied to be operated upon, but as the burn which caused the cicatrix was received during an attack of epilepsy thirteen years before, and she was still subject to frequent attacks of the same, Professory Gregory did not deem it proper to operate lest that in the next paroxysm she would undo all that the surgeon had accomplished. But, from the frequent importunities of the woman, he at last consented to operate, which was done after the following method: an incision was begun midway between the medium line and the angle of the mouth, and carried downward and outward to the point where the facial artery crosses the border of the inferior maxilla, and another incision from the same point to a corresponding point upon the opposite side. The lateral flaps were then elevated, their sides approximated, and resting upon the apex of the

triangle included between the two incisions, and retained in this position by a silver pin and figure eight suture. The sides of the lateral flaps were joined to those of the triangular one by silver wire sutures. The woman has shown herself at the clinic on several occasions since that time, and the operation has accomplished all that was intended it should."—(*St. Louis Med. Reporter.*)

"*Foreign Bodies in the Air-Passages; a New Method of Removal.*—DR. JOHN McDOWELL (*Humboldt Medical Archives*) recommends, in addition to inversion of the body, that firm pressure be made upon the projecting angle of the thyroid cartilage or *Pomum Adami*, so as to widen the aperture of the glottis. By inverting the patient we gain the benefit of gravity. If now the head be thrown back, the *Pomum Adami* firmly pressed upon the cervical vertebra, so as to relax the vocal chords, the lungs filled by a deep inspiration, and the chest struck a smart blow or compressed quickly by a strong man, the best possible opportunity for the escape of the foreign body will exist."—(*Pacific Med. and Surg. Journ.*)

"*Hæmorrhagic Diathesis.—Case.* By G. R. PATTON, M.D., Cincinnati. A boy of seven years, in falling, wounded his tongue, by one of his incisors. He was blanched and almost pulseless on my arrival, forty-eight hours after the accident. The physician of the family, who then could not be found, had already applied the perchloride and persulphate of iron, a sharp pencil of the nitrate of silver and long-continued compression, without success.

"On inquiry, it was ascertained that the hæmorrhage from a slight cut of the finger, had nearly resulted fatally on a former occasion. Instead of the actual cautery evidently here indicated, the application of nitric acid was substituted by the following method: a few drops of fuming nitric acid were drawn by suction into a small glass tube having a capillary extremity; this was pressed into the puncture and several drops of the nitric acid injected into the bottom of it, by compressing the air in the tube with the lips at the opposite extremity. The arrest was instantaneous and permanent."—(*Cincinnati Lancet and Observer.*)

"*Convenient Hæmostatic.*—DR. A. P. MERRILL says, 'A combination of elixir of vitriol and tannic acid has been recommended for this purpose, but I was not aware of its value until, in 1857, I accompanied a patient to the office of the late Dr. Horace Green, to obtain the benefit of his skill as a specialist in diseases of the throat. The tonsils, although not enlarged, the doctor thought in a morbid condition, and he pared a thin slice from the surface of each. Only a little bleeding followed during the day, but at two o'clock that night, his pillow was bloody, and called me from my bed in the same hotel. I found his pulse feeble, breathing labored, and strength greatly prostrated; and he soon vomited a great quantity of blood which had been swallowed. I could see the pulsations of a bleeding artery in one of the tonsils, and there was an oozing of blood from the cut surfaces. Having no other remedy at hand, I made a mixture of elixir of vitriol and tannic acid, and applying freely, the hæmorrhage was immediately and permanently arrested. Since that time I have used this mixture in various internal

and external hæmorrhages, and with uniform success. I am now inclined to the opinion, that whatever can be effected in such cases, and even in diarrhœa, by astringents, may be done by this remedy; and in emergencies it is more likely to be found within convenient reach than most other remedies of this class. A touch of the tongue with this combination, made in the strength of a saturated solution, will convince any one of its powerful astringency.'"—(*Med. Record* and *Med. and Surg. Reporter.*)

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"*Sulphurous Acid as Applied to Wounds and Sores.* By JAMES DEWAR, M.D.—It is obvious that any means of promoting the speedy union of parts which have been divided during surgical operations would materially contribute to the patient's advantage, and lessen the risks to which he is otherwise exposed. The following case, as showing that the existence of pus is not only an unnecessary but a preventible accident, has an important bearing upon the subject of surgical fever, and would encourage the hope that even over it we may be able to exercise some control by anticipating the evils associated with its existence. I have long been impressed with the fact of there being an antagonism between sulphurous acid and pus, but have not till now had an opportunity of fully testing its value. Miss ——, a young woman with a tumor in the breast; she had chloroform, and the tumor, which was about the size of a half-closed fist, was removed by a wound of about six inches long. There was little bleeding, and there was no occasion for ligature. The raw surface was carefully sponged with sulphurous acid, and the edges adjusted by four silver sutures. A piece of lint soaked in the liquid was laid over the wound, and this covered with gutta-percha, the dressing being changed every six hours. From that time till now the patient has never had the slightest uneasiness in the wound, which she could bear to have handled without apprehension; indeed, she said that if she did not see the wound she would not be aware of its existence. Union was complete within twelve hours. The stitches were removed on the third day, and two days thereafter my patient was in the garden. She assures me that there never was a stain upon the dressing.

"A young man had his hand severely cut when working at a circular saw. The wound was closed in the usual way, and the acid applied, as in the preceding case. The pain instantly ceased, and the edges have since united without any appearance of pus.

"I may mention that some months ago Professor Syme had a case in which the result was very similar. He told me that the sulphurous acid spray was applied to the raw surface, and that when he went to dress it for the first time he was delighted to find the healing process in an unusual state of forwardness.

"Sulphurous acid is superior in efficiency to carbolic acid, and is entirely free from the objection applicable to the latter, viz., of being a powerful irritant and having a disgusting smell."*—(*Med. Times and Gazette.*)

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"*The Sulphites as Antiseptics.*—Dr. Richardson read a paper before the British Association for Advancement of Science, by Dr. Polli, '*On the*

* The union of the two or of its salts with carbolic acid, may, however, prove most useful in cases where a combined stimulant and antiseptic influence is required.—Z.

Antiseptic Properties of the Sulphites.' Dr. Polli had undertaken an investigation as to the action of the sulphites of lime, hyposulphite of magnesia, sulphite of magnesia, sulphite of soda, and granulated sulphite. These substances were found to possess all the properties of sulphurous acid, with the advantage that their action was more uniform and certain and constant. In experimenting on animals and himself, Dr. Polli found that large doses could be taken without risk. On killing animals treated with sulphites, and others not so treated, he found that the former were most slow to decompose, and, indeed, remained quite fresh when the others were putrescent and offensive. Another series of experiments showed that the administration of the sulphites was sufficient to effect a more or less rapid cure in cases where blood-poisoning was present, as in fevers. The author thought his observations conclusive as to the excellent influence of the sulphites on the septic diseases, and remarked that it was for the purpose of exciting others to observe in the same field that he had brought his researches under the attention of the scientific world."—(*Ibid.*)

"*Valuable Antiseptic.*—If all that Mr. W. L. SCOTT claims for the bisulphite of lime be realized in practice, it is likely to be an agent of whose uses we may often avail ourselves in practice with advantage.

"'Beef-tea or broth, in hospitals or otherwise, may be prevented from turning sour by stirring in a few drops of the bisulphite of lime solution to each pint of the soup; and the same plan will enable us to keep jellies, which ordinarily decompose so rapidly in the organic germ-laden air of the sick-room, for many days unimpaired; these are, in my opinion, considerations of some moment in all circumstances, but most especially in the habitations of the poor. Clothes or matting, soaked in the same solution and hung up, act as disinfectants of the most effective kind, and do not exhale the peculiarly unpleasant odor of carbolic acid, or the irritating vapors, so distressing to the bronchial system, of the chloride of lime. I have successfully employed the bisulphite of calcium for the preservation of numerous anatomical and other specimens, as it does its work perfectly, and without occasioning the great changes of color and contraction of muscular structure so frequently produced by ordinary antiseptics; moreover, its special advantage over the preparations of mercury and arsenic lies, in my thinking, in the fact that it is not poisonous, and can therefore be handled with perfect safety. For ointments, a fluid drachm to each pound is quite sufficient to preserve them, while it has no injurious action whatever, and is quite compatible with the great majority of ointments and oily preparations—a remark which does not apply to the alkaline sulphites and bisulphites which have, from time to time, been brought forward for similar purposes.'"—(*Brit. Med. Journ.* and *Med. and Surg. Reporter.*)

"*Iodide of Iron.*—CL. BERNARD has ascertained that when iodide of iron is injected into the veins of a rabbit, iodine quickly appears in the saliva and the urine; iron is also found in the latter, but in what proportion? This second question Quevenne has proposed to resolve. He experimented on himself. In the morning before eating, he took 10 grammes ($2\frac{1}{2}$ drachms) of syrup of iodide of iron, or $\frac{1}{10}$ in perfect state of conservation, without an excess of iodine, which represented one gramme of dry iodide. From the time of the ingestion the urine was examined from five to six minutes, after a quarter of an hour, when

the salt has been taken with the food, iodine appeared in the urine, and half an hour afterward it existed *abundantly*.

"All the day iodine was abundant in the urines; next day it decreased, and the third day it disappeared. About three-quarters of the iodine absorbed, were ejected in this way, that is about 0.60. As for the iron, traces only have passed; it could be estimated at 5 miligr. $\frac{1}{3}$ for the totality of the urines, 3 kilog., 200 grammes (7 ℔s. $\frac{1}{4}$).

"Thus, when iodide of iron is administered, immediately a separation takes place between the elements of the compound, nearly all the iron is fixed in the economy, while iodine is abundantly expulsed in the urines."*—(*Journ. of Materia Medica.*)

"*Iodine and Carbolic Acid.*—The *Journal des Connaissance Médicales* publishes a letter addressed to Dr. Caffee on Dr. Percy Boulton's late discovery of the action of carbolic acid on iodine. 'The inconvenience,' says the writer, 'attending the external application of iodine and its preparations is so serious that physicians are often compelled to abandon a remedy the therapeutic efficacy of which is undoubted, nay almost unequaled in *materia medica.* The great objection to the external use of this remedy is, that it leaves marks both on the linen and on the skin. This is a sufficient motive for seeking some means of getting rid of this drawback, especially in the case of ladies. Dr. Percy Boulton's method consists in adding a few drops of phenic (carbolic) acid to the iodine solution to be employed. This addition renders iodine perfectly colorless, so that it may be applied with impunity. But this combination has another advantage. It appears from that practitioner's observations, which I can confirm, that, so administered, carbolate of iodine, which is the new substance in question, is not only one of the most powerful antiseptics we possess, but is intrinsically a more efficacious agent than iodine alone. I have used this compound under the form of injections, gargles, and lotions, in all cases in which iodine is prescribed. In sore throat, ozæna, abscess in the ear, etc., this preparation is a sovereign remedy; since, besides its disinfecting qualities, it modifies the mucous membrane, causes all local sensibility to disappear, and cures the patient much sooner than if either of the two agents were employed separately. The formula I employ is as follows: Compound tincture of iodine, 3 gms.; pure liquid carbolic acid, 6 drops; glycerin, 30 gms.; distilled water, 150 gms.' The writer then enters more particularly into the properties of carbolic acid, but with which our readers are already acquainted. Its efficacy as a disinfecting agent in the case of sores is well known; it may be prescribed in all cases in which tar water is administered, and is, we trust, now pretty generally adopted for disinfecting purposes in hospitals and barracks."—(*Sci. American.*)

"*Anatomical Models and Preparations.*—Among the most remarkable objects exhibited at the French Exposition Universelle, in the anatomical galleries, are the plastic models of Auzoux, and the preparations of Dr. Brunetti, of Padua. M. Auzoux models in a material which, he says, has nothing in common with papier maché, wax, or plaster, a complete typical series of the animal kingdom, from man to the zoophyte.

* Iodine from iodide of iron is also eliminated through the pulmonary organs, and will often thus act beneficially in resolving chronic inflammation of the lungs and air-passages.—Z.

In the vegetable kingdom, he shows a collection consisting already of one hundred types, showing the constituent parts of flowers, fruit, grain, leaves, and stalk, in the most careful detail, and even in the mosses and the fungi. These models are not only of the object *en masse*, but of its parts. The whole of the anatomy of animals and plants, the comparative anatomy of the nervous system, the comparative embryology, are here all fully and admirably illustrated. They are the most complete and the most accurate and the most extensive series of anatomical works ever attempted. One hundred workmen are constantly employed; they are carefully instructed, and their knowledge of anatomy and physiology would shame many a good anatomist. The workshops of M. Auzoux are the chief support of a flourishing village, St. Aubin d'Ecroville.

"M. Brunetti, of Rovigo, professor of the University of Padua, surpasses even M. Auzoux. His preparations are not imitations, but literally arrested life. He shows the head of a young woman who committed suicide in 1861—the features unaltered, and the texture still natural; a hand prepared in 1865, in which the articulations move with incredible facility; the arm and forearm, with the movements of pronation and supination fully preserved. M. Brunetti anticipates presently completing his process, so that he may be enabled to preserve the entire body in one piece."—(*Brit. Med. Journ.* and *Med. News.*)

Paraffin for Lubricating Machinery.—F. Moigno states "that a new application of paraffin has been made by M. Monnet for lubricating machinery. The great difficulty was in procuring a lubricating substance that would not melt at a lower temperature than from 300° to 400° Centigrade, and cheap enough to be employed at Lyons on a large scale. Now, the class of paraffins furnishes a substance called melen ($C_{40}H_{80}$), insoluble in water, soluble in fatty oils, volatile without decomposition, and only boiling at above 370°, while at the ordinary temperature it has the consistence of wax, and floats freely on water. Its degree of softening at the temperature of the hand, from 15° to 20° C., is already sufficient to form between surfaces in contact a thin sheet of melen, and according as the heat increases the substance becomes softer until it acquires a complete liquidity which is uniformly kept up.

"The following are the advantages arising from paraffin or *melen* lubrication:

"1. During the working of the machine the lubricating substance is very fluid, oily, and unalterable. The melenic particles, carried by the steam, clot together on the surface of the condenser, and can be removed without difficulty.

"2. When the motion has ceased the paraffin remains fixed and becomes solid much quicker than lubricating oils commonly in use, which are fluid at ordinary temperature.

"3. When the machine is set in movement, the paraffin adherent to the surfaces to be lubricated is melted at once, while the steam gives its heat to the mass of metal of the receptacle before it acts upon the piston. The high temperature of the elastic fluid soon equalizes the temperature, and the fusion of the paraffin takes place."—(*Chem. News.*)

Nerves of Nerves.—"M. Charles Robin announced that M. Sapey had discovered the nerves of nerves, *nervi nervorum*, the existence of which was well known, but not well observed. He examined by a mi-

croscope the mucous membrane and found that they formed round each nerve so many fibrous nerves that inclosed a canal in which the nervous pulp was lodged."—(*Ibid.*)

"*Electrolysis.*—It has generally been inferred that the power of nitro-hydrochloric acid as a solvent for gold and platinum is owing to the evolution of free chlorine. The proof of the inference has been this: when aqua-regia is heated until no more chlorine is evolved, the residual liquid is 'found to be a solution of hydrochloric and nitrous acids that is incapable of dissolving gold.'—*Turner.* In experimenting on the electrolyzation of compounds the other day, it occurred to me that this hypothesis is capable of decided proof; and this was the series of experiments. 1. Into an ordinary apparatus for the electro-chemical decomposition of water, having platinum electrodes, a weak solution of hydrochloric acid was poured. Over the anelectrode a glass tube was placed, and in this tube some gold leaf. Twelve pairs of Wollaston's double coppers were employed excited by dilute sulphuric acid only. On completing the circuit, the penetrating odor of chlorine was very perceptible, and in a few seconds the gold in the tube over the anelectrode was completely dissolved; as also were some fragments that had been put into the solution outside the tube. 2. If chlorine has this power over gold it may be supposed that the chloride of either a metal or an alkali, providing that the compound is an electrolyte, will exhibit, on electrolyzation, the same result. Chloride of sodium was the substance first experimented with. A saturated solution of the salt was made, and with precisely the same arrangement as before, the gold in the tube over the anelectrode was speedily dissolved. 3. The same result was obtained on electrolyzing a solution of chloride of ammonium and chloride of barium. By a power of twenty pairs of Wallaston's double coppers the gold was dissolved with a rapidity equal to that when a solution of chloride of sodium was the liquid electrolyzed. Both times the blue color of litmus was quickly discharged, but there was no previous reddening of the coloring matter to indicate the generation of hydrochloric acid. 4. A solution of chlorate of potassa was the liquid next electrolyzed. With the same power of twenty plates the gold was very gradually dissolved, though the battery was in good action. The odor of chlorine was perceptible, though fainter than in the former experiments. A solution of litmus was poured into the vessel, and a tinge of red was then perceived at the anode owing to the action of the evolved chloric acid upon the coloring matter. The blue color of the solution became fainter by degrees, evidently proving that since chloric acid does not possess bleaching properties, free chlorine was evolved. Possibly this formation of chlorine from chloric acid is a secondary result of the current; but it is quite as probable, and more so, that the chlorate of potassa and the chloric acid were successfully decomposed by the current of electricity. I am not aware that the dissolution of gold, and the influence of chlorine over the metal has been shown in this way before. True, Davy has proved that nitro-hydrochloric acid does not dissolve gold unless free chlorine is developed. Mr. Grove, also, has shown the action of chlorine liberated by the voltaic current; but in a different way. Two strips of gold leaf, one in nitric, the other in hydrochloric acid, in contact through a porous division, were connected by a gold wire: the hydrochloric acid was decomposed, and the gold in it immediately dissolved. The experiments now made, may not possess the less interest

because they refer to a foregone conclusion, and show that by the decomposition of other compounds of chlorine besides hydrochloric acid the precious metals may be dissolved.—ERNEST W. BARTLETT."—(*Chem. News.*)

"*A New Way of Cutting Glass.*—"Take of powdered gum tragacanth, one-eighth of an ounce; dissolve it in sufficient water to form a middling thick paste, then dissolve one-fourth of an ounce of finely-powdered gum benzoin in the least possible quantity of strong alcohol; mix both solutions thoroughly, and add to this a sufficient quantity of finely-powdered beechwood charcoal to form a doughy mass a little thinner than pill compositions. Out of the above mass roll little sticks about four inches long and three lines thick, and let them dry spontaneously. If, after being thoroughly dried, one of these sticks is ignited, it burns to a fine point until it is entirely consumed. The glass to be cut is first scratched deeply with a diamond or file, then one of the above sticks is ignited and held with a very slight pressure on the crack, in the direction the cut is to proceed, and it will be found that the cut will follow in any direction the 'taper' may be drawn. The taper must be withdrawn every few seconds and brought to a more lively burn by brisk blowing, as it is cooled by the contact of the glass. By these means all kinds of vessels can be formed from otherwise useless bottles. Thus, for instance, by cutting the tops off of bottles, jars are obtained which are excellent as precipitating vessels."—(*Humphrey's Journ.* and *Drug. Circ.*)

"*Polishing Steel.*—A German engineer states that oxide of chromium is the best substance for polishing steel. The article can easily be prepared by heating bichromate of potash to redness. It is also used for painting on porcelain. One equivalent of chromic acid is reduced to oxide of chromium, and on well washing the residue of the ignition neutral chromate of potash is washed away and the oxide is left behind."—(*Sci. Amer.*)

Bright Deposit in Electro-plating.—According to a correspondent of the *Sci. Amer.*, this may be obtained, "a French authority says, by adding to the silver bath sulphuret of carbon or an alkaline sulphuret, which will cause the silver deposit to be as brilliant as if carefully burnished."

BIBLIOGRAPHICAL.

The Principles and Practice of Laryngoscopy and Rhinoscopy in Diseases of the Throat and Nasal Passages. Designed for the use of Physicians and Students. With 59 Engravings on Wood. By ANTOINE RUPPANER, M.D., A.M., Member of the Amer. Med. Association, of the Mass. Med. Soc., of the Co. Med. Soc. of New York, etc. New York: A. SIMPSON & Co. 1868. From LINDSAY & BLAKISTON.

This is an attractive monogram, handsomely printed on tinted paper, profusely illustrated, and neatly bound. It gives a succinct sketch of the history, discovery, development, and practical application of laryngoscopy and rhinoscopy, with a list of the principal authorities on the subject, and a general index to its contents. It will prove a valuable aid to those interested.

THE

DENTAL COSMOS.

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ORIGINAL COMMUNICATIONS.

CAUSES OF THE DECAY OF TEETH.

BY C. S. WEEKS, NEW YORK.

An Essay read before the Society of Dental Surgeons of the City of New York, Wednesday evening, December 4th, 1867.

"WHAT causes the decay of teeth?" is a question which is probably oftener asked the dentist by his patients than any other. Very few, however, pertaining to our profession are so unsatisfactorily answered: not only to the patients, which would require more time than could be given to make the matter clear to each individual querist, but to ourselves as dentists.

This question, the correct answer of which can alone furnish the basis of a dental practice both remedial and preventive of disease in these important and beautiful organs, usually receives a far less thorough examination than many which in comparison with it are of but little importance. The result is that efforts well intended too often help to promote the trouble they were applied to prevent. I say this not only of the more ignorant and inexperienced, but also of the oldest and ablest practitioners in fact of our profession generally.

Passing the primary question by with but a superficial examination and answer, we of course adopt remedial agencies which at best produce but temporary benefit, and sometimes injury.

We expend our efforts too much in skimming the mere surface of the field of dental practice—observing present phenomena, but overlooking the universal and eternal principles of which these are only the transient and perhaps warped and defective expression.

Too much of the student's time is wasted in making himself familiar with the lore of decaying schools, in acquiring a flippant use of technicalities. These are mainly the mummies of infantile scientific thoughts —useful some of them *at times*—but which pedantic pretenders to ex-

clusive dominion in the realm of science would make an authoritative nomenclature to conceal ideas from the people, and enable them to pompously display their own erudition. This crowding the unfolding life-thoughts of science into the shells of dead languages, which when living had little more than vague fancies instead of scientific principles to express, greatly cramps the truth and mystifies the perception; yet the language in which we are accustomed to converse is regarded as "*unprofessional*," even when it expresses the idea with greater brevity and clearness.

Then again our stand-points are so beclouded, that we see very imperfectly at best. The greatest difficulty in receiving truth is *to make room for it* by displacing old errors; particularly when *they* are projected into the mind with all the force which the sanctions of antiquity and the authority of great names give them.

I shall, as far as I am capable, get *above, or, if you please, below*—burrow under—such authority. So far as *it* has truth on its side, it will be able to stand *unpropped* on *that* foundation and *substantiate* its ideas; and when demonstrated, the reverence it claims will be involuntarily and spontaneously accorded to its truths.

But to the question—"What causes the decay of teeth?"

We generally answer, that it is the chemical action of acids, dissolving the lime which constitutes most of the solid substance of their composition.

True, so far; but why should this occur more with mankind than with animals? Why with the civilized more than the savage? and with domestic animals more than with wild ones? We may answer, because the teeth are more solid and perfectly organized in the last named. Again, we ask, is this difference in structure sufficient to fully account for the greater durability of the latter? We say "no; but that there is more acid in the mucous secretions of the former." But for what reason? We answer, because men are less healthy than animals, and the cultured of both, less than the wild—that the acidulated condition of the salivary secretions is a diseased one.

But this only changes the form of the statement and again calls for the inevitable question—Why is this so? Did God and nature *design* that the more perfected of their creatures should be more imperfect in this respect, and that the grand crowning ultimate of their labors—man—should be most of all defective in these organs so essential to nutrition, and the development of a sound mind in a sound body? Certainly not!

But we may say "children are defectively organized," "born of unhealthy mothers." But why are the mothers unhealthy? The unnaturalness of female dress may partially account for it; but the chief causes are far deeper, and the trouble is partly attributable to *their* having unhealthy fathers as well as mothers.

Undoubtedly the answer to our first question will include answers to the others. An inquiry into the causes of the decay of teeth involves a consideration of the facts and philosophy of the manner of living: and answering that inquiry will show the causes of the premature decay of the whole physical organism in the majority of our race; and of the comparative freedom from such results among animals.

Of course a subject of such magnitude can only be glanced at in the time we can give to it, and in attempting to hurriedly handle it, one may well be excused should he begin in the middle and end at the beginning.

Defective organization and bad health, then, are undoubtedly the immediate causes of the trouble. But the causes *of these* are what we are to inquire for. In general, we answer, *they* are the violation of the relationships and harmonies of our natures.

But we want to be specific and show a few of the more grievous ways in which we violate the organic laws and superinduce premature disorganization.

First, then, causes *are like their effects in kind. The effects* about which we are inquiring *are decay. The causes are decay—disorganization wrought into organization—food in imperfectly organized and even disorganizing conditions.* It would seem a sweeping assertion and a rather shocking one to our fastidious epicures, that they are living largely not only on the crudities and grossness of nature, but also on carrion or its counterpart; yet such is the fact.

All matter which has reached the organic degree of refinement exists in either what we may call the building up or the tearing down condition and character. The first is constructive of organizations; the latter decomposes such as have so far as circumstances permitted fulfilled their purposes and given up the progressed living principles, that they may be wrought into other forms. *The latter* can only serve the constructive process by first being entirely resolved into their original elements. In fact all matter—the crude as well as the more perfected—tends toward *ultimate* organization, but the gross and undeveloped can *only* fulfill the requirements of the highest conditions *by first* passing through all the progressive stages of decomposition, recomposition, and refinement.

Only the finest organic substances, in their stage of healthy maturity and ripeness, can effectually supply the needs of the human organic structure.

Very low and gross organizations may appropriate substances of a gross character, and all organizations, including the human, have great power to throw off clogging matter, and to carry what cannot be got rid of, and also to separate from decomposing matter that which has not, or has but slightly been involved in the decomposition. Hence the

injurious effects are slowly produced; but with the causes long enough continued are sure and fatal. They are long and vigorously opposed, *but* at the expense of gradual injury to the overworked and wrongly worked organism.

Either of these two conditions of organic matter then inevitably carries with it in its course all other organic matter which it enters into combination with.

I say we feed largely on decay, as well as on crudeness, grossness, and defective organizations. We devour that which is in decaying conditions, and therefore contains *but part, and not the best part,* of its organic and organization building constituents, together with an excess of waste materials to clog the organs, and dead matter to inflame and decay the tissues with which it comes in contact.

We call that dead matter *only* which *was* organized but *is* in decomposing conditions. By the gross we mean very low forms of life; by the crude the unorganized, and the earthy remains which combustion or otherwise completed dissolution leaves of organic substances. The defectively organized are the immature, and those developed without a due proportion of some of their constituents. The latter as well as the former favor premature decay of the body by affording defective nourishment and thus leaving it susceptible to its ravages.

The best food which people of all long-settled civilized countries eat, the fruit and grain, in their ripe and most perfected condition, are greatly lacking in some of their normal ingredients.

In countries sparsely inhabited by savages and wild animals vegetable substances grow spontaneously from the soil which it is richest in the constituents of; and but a small portion of these products being eaten, their constituents are constantly returned to it in such quantities as to keep up the necessary supply of the same in the crops. Hence wild animals and savages receive the same in their food.

Civilized man cultivates small patches of land for a livelihood and for gain. His many wants and the large number of wealthy non-productive drones, who grasp and squander the largest portion of the products of his toil, make it almost necessary for the agriculturist to strip the soil of all it will produce, returning to it only what is of no direct use to himself.

Beside this, our farmers have not generally brought a knowledge of chemistry and arithmetic to the work of analyzing the soil and their crops, determining the constituents of each, and what and how much is taken from the former by the latter, and to the kinds and quantity of manure required to make up the deficiency. Hence the products of the impoverished soil become deficient in those ingredients which only the soil can supply, leaving those only plentiful which are obtained from the atmosphere; particularly deficient thus in the refined mineral matter,

lime, etc., which is the basis of the most solid portions of all organisms. The frequent diseases of vegetation, as smut and rust in grain, the rotting of potatoes, etc., are the result of slight irregularities of the seasons acting on these interior defects.

Thus we find that our best food is generally organized in the very conditions for premature decay, and of course carries those conditions into all bodies which feed upon it.

When this defective vegetation is wrought into more disease, susceptible organizations of animals fed on it, and we eat the animals, it doubles the difficulty. It more than quadruples it where the animals are not allowed to run at large, take natural exercise, and select such food as their instincts teach them is least unsuitable to their natures, but instead are shut up and fed on such as best suits our pecuniary interests, till gorged with grossness and disease.

Tenfold, then, is it increased when the vile, filthy hog is thus shut up, raised on the worst of this defective matter, in such foul, decaying conditions that nothing else will eat it, and *even he* would contemptuously spurn if allowed to follow *his own* sense of decency, then fatted to the very extreme of nasty scrofulous putrefaction for human food.

Then again in the manner of preparing and cooking our food comes a still greater portion of our trouble. Indeed, any cooking doubtless expels much, if not most of the life principle of organized bodies. But the manner and the accompaniments of cooking are worse than the thing itself. The object is not to make the food best for building up a healthy and vigorous system, but simply to gratify the taste—to produce the highest pleasurable excitement of the gustatory organs. For this purpose the arts of chemistry are blindly and empirically employed. In the morning twilight of this science, men have perceived the analogy of the nutritive functions to the chemical changes occurring in grosser matter, but have not become sufficiently acquainted with the principles of vital action to fully realize the fact that the refined and delicate human organisms cannot work the gross, undeveloped materials into their own compositions; that, though the same elements compose the substances of all the kingdoms of nature, yet that each can only digest that which has reached the stage of development next below itself; that *all else* clogs and impedes vital action, and if *greatly below* its degree of refinement, tends to decompose the vital tissues—in other words, that though animal and human organisms require minerals as their basis, they cannot appropriate them except they are first taken up, digested, refined, and assimilated by vegetation.

Not understanding this fact, chemistry is used to get these ingredients both from the mineral kingdom direct, and from the crude remains of decomposed vegetation, which had been taken up by it, but not yet vegetably refined, and to concentrate them for use in human food.

Then our culinary art and its preliminaries remove, by bolting our flour, peeling our fruit, etc., a large proportion of the small proportion of the refined mineral ingredients which our miscultivated vegetation contains, and adds the preparations from minerals, and the mineral refuse of gross vegetable matter, such as salt, soda, saleratus, etc.

Then come the spices and condiments to tickle the palate, irritate all the mucous surfaces, inflame the stomach, and fire the blood. Then narcotic beverages, as tea and coffee, or tobacco, or both, to work the nervous system first up to an exhausting struggle of resistance, and then down into stupefied acquiescence and morbid craving for more.

Then in the matter of a beverage, when Nature's is used, sometimes from convenience of location—but often from choice—that is taken which is impure—mineral waters, instead of the pure, soft spring, running brook, or heaven distilled rain, under the absurd idea that the crude minerals held in solution can properly supply the system's want of similar ingredients.

Another serious defect in our cookery deserves especial attention, and that is the leavening or fermenting our bread. Few have properly considered what this process is. It is nothing less than subjecting the substance of the flour to the first stage of actual decay—a process which expels most of the life principle of the grain, and converts a large portion of its best materials into alcohol, which escapes in baking, leaving in its place the partially disorganized matter. It is as if in eating apples or other fruit, we first should crush them, and letting them stand till half fermented, should then press out and throw away the juice, and cook and eat the pumice.

Many who are somewhat aware of this fault in bread-making, still acquiesce in its practice, under the idea that there is no other way to make it light, except the worse one of using acids and soda or saleratus, leaving their clogging compounds to be eaten with it. They suppose that bread made light by fermentation is better for health (as well as to the taste) than heavy bread.

They are in both respects greatly mistaken. First, unraised bread—I do not mean bread which the process of fermentation has been attempted upon, and after destroying the life of the flour as effectually as though it was raised, is allowed to fall in baking till it is clammy and dense as whet-stones, but I mean bread made of pure flour without any attempt to raise it—would be far more healthy and more palatable to the uncorrupted taste of a child than any leavened bread ever made. The second mistake is in supposing that bread cannot be made light except by fermentation or chemical admixtures. Properly prepared and baked, it can be made lighter than any fermented bread can be without carrying the fermentation to the second or sour stage.

And here, as the matter is so very important a one, I will digress

and tell how to make such bread, for the benefit of those who do not already understand it. First, then, you must have pure, healthy flour—not necessarily white; Graham flour works nicely, though the taste is not so rich—but flour from grown grain will not do. It will not rise, but will be sticky and pasty.

Take then flour and cold water, or half milk and half water makes it richer but no lighter (all milk is not so good), and use nothing else in it, unless you think you must have a little salt, but 'tis better without; not having the insipidity of fermented flour, your butter makes it salt enough. Mix then your ingredients into a stiff batter—about as thick as will pour out readily. Use bake dishes with small divisions, for small biscuit-like loaves—what are called French roll-pans* are the proper articles, and cast-iron ones are the best. Heat these very hot on the top of a stove or range, grease them, pour in your batter and bake them in a briskly-baking oven, when the conversion of the water they contain into steam will raise them more perfectly than fermentation can, and leave you all the substance of the grain, and bread so much more palatable that one taste of it will cause you to render a unanimous verdict of banishment against the other kind without leaving your seats.

This bread may be eaten warm by a dyspeptic with perfect impunity. Not having commenced the process of fermentation, the feeblest stomach can digest it before it reaches even the first stage of it. Containing no fermented matter to start the work, it would require many times as long for it to commence as would suffice to pass bread from the first to the second or sour stage of the process, or even to the third and last, the putrifactive. Therefore a feeble digestion has abundant time to dispose of it before it sours.

Thus we see that civilized men have for ages been subjecting their flour to the first stages of the rotting process—living in this as well as in other ways mentioned and to be mentioned, on the counterpart of carrion, when much less labor would give them bread far better in every respect. Try it; a few trials, if not the first, and you will succeed, will be astonished at the result, and will never again from choice eat the old make of bread.

Having shown, then, that fermentation is decay; that the first stage of it changes the starch and sugar of grain and fruit into alcohol—a working agent of the process—what shall we say to the course which instead of evaporating it in the middle of that stage and eating the dying pumice, rather carries it to the end, and extracts that essence of death itself, and takes it into the human stomach?

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* They consist of twelve divisions for loaves in one pan; each three and a half inches long, two wide, and one and one-eighth deep; have perpendicular ends, and oval bottom and sides.

The advocates of the use of alcohol generally suppose it to be contained in nearly all fruit and grain, but the fact is it is not produced by or contained in any product of nature while that product is in a condition of healthy growth or maturity. Normal ripeness knows nothing of it. Only when crushed and decay commences it is developed.

They say "it is a pure substance and good." Yes, all things are pure and good for their purpose. They call it "a creature of God." Yes, it is—the first of his agents for decomposing organic forms, which, when they have served their purpose, require resolving into their original elements before they can begin a new career of development.

So faithful a servant of God is it, *so true* to its appointed work, that it will do nothing but commence the decay of any living thing with which it comes in contact.

Alcohol separated from that which produced it, and from all other materials, preserves from *entire* decay organic forms immersed in it, for its mission *is not to finish but to commence* the work. It must yield up its work to God's other servants, its fellow-disorganizers—the acetic and putrifactive fermentation—before it can be completed. It carries it forward just so far as was the condition from which itself was derived. It destroys the delicate vital tissues. Fruit long kept in it will not germinate, and any plant habitually *watered* with it (*if such a misnomer* may be allowed) will surely die. It will always drive out the life principle, and when its mission is fulfilled and its duties performed, if left to itself, it always resigns its office and vacates the premises for its divinely-elected successor.

Such is alcohol. No drop of it passes the human lips except to injure. The stimulus consequent upon its use is but the life principle's struggle with the spoiler for the possession of its home.

The elements which are its constituents are required by the body, and this fact has caused some short-sighted peepers into nature's chemical laboratory to argue that it supplies these to man, overlooking *the other facts* that it is an entirely indigestible compound, *and a destructive instead of a constructive agent.*

So this first-proof essence of rottenness is used by human beings to such an extent that in our country alone the government can be defrauded of its tax on it, to the amount of over one hundred million dollars per annum, and still receive many millions from it. Human bodies enfeebled, semi-decayed by this deadly agent, through their own or their ancestors' use of it, are all around us. Those who are entirely free from its effects, either direct or hereditary, are but the rare exception instead of the rule, if indeed there are *any* such.

The deleterious effects of impure air, particularly the poisonous exhalations from swamps and the decomposing filth of great cities, may be said, and with truth, to be among the causes of defective human organi-

zations, but this is a small evil in comparison with the others named. Nature, ever kinder to man than man is to himself, with her tempests, and even with her gentle breezes, breaks up the local stagnation of our earth's atmospheric envelope, and restores a healthy equilibrium. Human ignorance and greed cannot so effectually rob the air of its constituents (or adulterate it) as it does our food and drink. Within the precincts of our houses we, to a considerable extent, do prevent the kindly atmospheric purifications.

The effects of colds might be named as impairing organic vigor and promoting decay, yet but for the semi-decaying conditions from the *main causes before named*, such a thing would be unknown. *Even now*, when we are in a tolerable degree of health, with a fair digestion, we are nearly invulnerable to colds.

Infectious and epidemic diseases may perhaps be said to sow some of the seeds of premature decay, but they are rather the ripening of the products of seeds sowed long before and rankly growing. The man of fair health meets them with impunity.

The effects of inordinate passions and vicious excesses are often and with truth said to cause much of the trouble of which I have spoken. Probably they are among the most prominent of the *nearer causes* of the many debilitated and decaying organisms around us: yet, but for the system's struggles with the destructives before named, there would have been no such feverish condition of the blood and the organs as prompt to such excesses. Pure healthy blood—such as comes from proper food and perfect digestion—produces cool and regular action of all the organs of both body and mind. Under its influence man's passions would be as regular and as little prone to abuse as are those of the animal creation.

Thus we see that most of the ailments which body and soul are heir to, come primarily from the terribly abused and long-suffering stomach. Nor can justice to my subject allow me to close the catalogue of its abuses with the last named. Great numbers of them must be left unmentioned, but one or two others I cannot pass by.

Superstition, the offspring of ignorance, which, with reference to the spiritual nature, teaches that the consequences of sins may be escaped from, also looks for the same immunity for sins against the organic laws. It carries the same irrational notion into the vestibule of the arising temple of science, and tries to base a healing art upon it. It leaves upon the doctors as well as the people the absurd fancy that God has left somewhere in the realms of creation a vicarious atonement for physical transgressions. An atonement which is tantalizingly hid from the needy sufferers, but which if man's intelligence can discover, he may, by swallowing it, secure immunity for his wrong-doing, and defeat the regular operation of the Divine laws. Even where it holds sickness to

be an especial dispensation of providential will, it caps the climax of this absurdity, by supposing that the divine purposes may be thus thwarted.

This superstition, 'tis true, has less hold upon the doctors than the people. The most enlightened of the former must *appear* to humor it in order to retain their patients; but it is an open secret that their greatest successes are achieved by the use of bread-pills and the like—these being used to quiet the patient's fears and increase his faith, while nature, with hygienic agencies, effects a cure. I say it is an open secret with many, that such is the practice of the best of our physicians, but only those within "the ring" know when and to what extent it is adopted. Noble-hearted humanitarian hypocrites, who, while unable to eradicate superstitious follies, humor only to prevent them doing harm, just as they would deceive an insane man to get or keep from him the weapon with which he sought to cut his own throat! God bless such unselfish hypocrites! and increase their number till their mission is fulfilled and they are no longer needed!

But unfortunately for the present time, such doctors are too small a proportion of the profession. Most of them, in common with their patients, partake too much of this superstition. Therefore, when all the causes I have named, with others unnamed, so assault the soul's citadel as to exhaust the vital forces in the struggle against it and make the sinner unmistakably sick, then every substance in nature almost is by turns tried in hopes it may prove the infallible panacea for the present ill. The poisons of gross vegetation, deadly to the delicate human organism even when health and vigor is present to contend with them, are now gathered and forced upon the debilitated and desperately resisting stomach and vital organs. Alcohol is given "to stimulate," that is, to arouse a still more exhausting struggle to expel this essence of death; and even the crude minerals, which can never enter the system except to injure, and should only be given as antidotes to other poisons which were injuring worse, are brought to reinforce the horde of destroying enemies; till the poor body—prostrated by its first trouble, and these more deadly clogs and corrosives—dies, or partially recovers in spite of them, to linger for a brief space more dead than alive; and to propagate debilitated offspring without the vital vigor necessary to well construct any of the parts, much less the finer and denser portions of their bodies.

Are not then the causes of bad health, and the premature decay of the human organism and its parts sufficiently apparent? Is it not equally evident why wild animals, which are free from *these causes*, escape their destructive effects? And is it not as plainly seen why domestic animals, which are only to a partial extent subject to the first named of these evils—bad agriculture—are more subject to the troubles under

consideration than the wild ones, yet far less than mankind? Look at the cattle fed on the pumice from your distilleries, and you will see teeth and all of their organs prematurely destroyed as rapidly as in any of our crumbling humans. With bodies well developed—with all portions completely nourished and unclogged, human beings would be as little subject to disease or premature dissolution of either the whole or any of their parts as are the wild animals.

Such then are the causes of the decay of teeth. What can dentists do to remove them? What more than to repair the mischief they effect in their patients while the general work of destruction is constantly renewed?

I answer, he can investigate and help point out the causes, till the now dawning twilight of science shall "deepen into day," and make them so plainly apparent to all that mankind shall no longer thus violate the laws of life.

Then, though ages may perhaps elapse before the negative hereditary effects of past transgressions will entirely disappear, yet the active havoc will soon cease, and the recuperative powers of the human organism will rapidly repair the damage done by old sins.

Now, too, many dentists even adopt the ridiculous idea of drugging their patients at times preparatory or supplementary to operations on the teeth. "*Constitutional* treatment" it is called by those who practice it. The most unconstitutional procedures toward the individual body, as well as the body politic, *are generally* most eager *to usurp* that name.

This absurd relic of superstitious nonsense should be discarded. We should learn that whatever enters the stomach, except good food and drink, enters to injure.

"*Constitutional* treatment" for patients! Yes! Put them on constitutional treatment—on *hygienic* treatment—and "throw physic to the dogs" (who know enough to let it alone), or give it to old Slavocratic Party, Esq., now gasping in the agonies of black vomit.

The students of our profession should be taught chemistry; but should be taught that organic chemistry is a finer and more delicate process than the chemistry of the unprogressed mineral kingdom. That the human stomach is not the place for a charnel-house or garbage field, nor yet for a laboratory of nature's crudest and grossest materials; but rather a higher one to analyze her organically refined products, and appropriate the living principle and purer substance to the developing soul and body.

Let them, if you please, if they have time and inclination for it, study the Materia Medica; but merely as a record of the gropings and stumblings of the scientific mind amid the ruins and rubbish of old superstition. Let them be taught whatever will make them better men and

better dentists, but leave them to employ the time, now wasted in obtaining useless acquirements, in learning the principles of our profession—the laws of organic existence—and gradually instructing their patients to co-operate with *them* in removing the causes of the premature decay of human bodies and human teeth.

HARDENING AND TEMPERING.

BY F. K. CROSBY, D.D.S., LYNN, MASS.

THE ability which we possess of producing such a change in the condition or structure of a substance as shall render it more or less resistant to compression, is one whose value is sufficiently demonstrated by the wider range of usefulness thereby afforded to the metals in the mechanic arts. We shall find this fact more particularly illustrated in the example of the modification of iron, known as steel, whose application would be comparatively limited did it not possess the property of assuming the various degrees of hardness necessary to its advantageous employment in numberless instances. Experience has taught us the art of so exactly producing in it a given condition, that we are enabled to adapt it most accurately to the particular purpose for which it may be required. The study of the means by which this result may be attained leads us to consider in the first place the nature of the property which we term "hardness."

We may define this condition to be that peculiar arrangement of the particles of a substance which enables it to resist compression. I use the term "arrangement," since we are not justified in presuming that the hardness of a body results from the inherent hardness of its atoms. This may at first be considered as the advancement of an untenable theory, but a moment's reflection upon the nature of atoms affords good ground for its defense. If the hardness of a body is caused by the hardness of its atoms, a *change* in the hardness of the body must be effected by a change of hardness in the atoms. Is this possible? We have, for example, a piece of iron; it possesses a certain hardness; we heat the iron, and it becomes soft. If we do not allow that this phenomenon results from a change in the *arrangement* of the particles, we are forced to conclude that the atoms themselves have undergone a change. Now we are taught that atoms are indivisible, and we cannot conceive of a change in an atom which does not imply a *motion* in its *substance*, which from its very nature must be impossible. A change in color must be a movement of particles permitting the reflection of differently colored rays; a change in form presupposes the existence of finer particles which move one upon the other. We then conclude that atoms do not admit of change, and consequently infer that the hardness

of a body is not dependent upon the hardness of its final particles themselves. In accordance with our theory, an atom of wax is as hard as an atom of iron; were it not so, it would admit of compression, and compression necessitates the idea of motion in substance, which, in the case of final particles, has been shown to be impossible. Concisely, then, the relative hardness of bodies is due to relative atomic arrangement.

What the peculiar disposition of the particles in these different conditions may be, is beyond the limit of human knowledge to determine. The impossibility of experimental demonstration, and our consequent dependence upon theoretical assumptions, serves to render the entire subject eminently complex and difficult. Let us, however, assume for the moment that a greater degree of hardness is due to the *closer approximation* of the particle. This is, in a great measure, true, as attested by the effect produced by hammering and rolling the metals, but that this rule is not general in its application is proved by the experiment of heating steel to redness and immersing it in cold water: the steel has expanded in all directions, in other words, increased in bulk. The particles evidently approximate *less* closely, but the hardness is greatly increased. There are, however, points of a still more mysterious character; for instance, the atoms composing two similar bodies may be arranged alike in one particular and unlike in another; as an example, suppose two bars of steel, each possessing the blue color. Now color is not necessarily an index of hardness, for here we may have produced it in the one case by hardening and drawing the temper, and in the other by simply heating it to the blue color without its possessing any temper at all. We should suppose these two pieces to have the same molecular arrangement, since the particles of both are so disposed as to reflect the blue rays; nevertheless, this is not the case, for the bars possess different degrees of hardness. This is apparently inexplicable, yet it does not prove the unsoundness of our theory. If we melt together one hundred pounds of copper and twenty-three of tin to form bell-metal, the resulting compound will weigh *more* than one hundred and twenty-three pounds, but our faith in the axiom that "the whole is equal to the sum of its parts" is not materially weakened thereby. Said Hamlet, "There are more things in heaven and earth, Horatio, than are dreamed of in your philosophy." The remark applies no less pertinently to the present age.

To return to a more practical view of the subject, we find that most metals undergo no very perceptible change, whether suddenly or slowly cooled from the red heat. This is true of pure hammered iron, but impure malleable iron hardens by immersion to a certain degree. Copper is considered by some to become softer when suddenly cooled, and the same means which are taken to increase the hardness of steel, as the addition of salt to the water, are said to increase the softness of copper.

Steel, however, by sudden cooling from the red heat, is made capable of receiving an extreme hardness, which fits it in an eminent degree for purposes where no other metal could be made available. This hardness we are able to modify in regular gradation from its hardest point to its softest state; these conditions, ten or twelve in number, are denoted by the color of the steel. After it has been heated to redness and plunged in cold water, by subjecting it to a heat of 430° we produce first a pale yellow, which, with the increase of heat, changes to various shades of straw color, thence to several tints of purple and blue, until at 630° we reach a pale blue with a green tinge. Tables may be found in various scientific works giving with accuracy the exact tints, together with the degrees of heat required to produce them, and the uses to which the steel in its different conditions is most particularly adapted. It is unnecessary to repeat them here.

When the steel has reached the condition which we desire it to retain, as denoted by the color, the further progress of the heat is suddenly checked. For this purpose various substances and mixtures are used, whose relative value depends upon their power of conducting heat rapidly. Experiments have shown that mercury possesses this property in a high degree; salt and water, plain water, and oil produce excellent results. Oil is not adapted to the cooling of large articles, as it conducts away the heat too slowly, leaving the piece in a softer condition than is desired. Thin blades of steel are quickly cooled by being placed between two cold, smooth, metallic surfaces.

The scale produced by hardening should always be removed before tempering, that the color may be more easily discerned, and that the cooling medium may have free access to the body of the article. In hardening small instruments, as excavators and pluggers, by covering them with a solution of soap before heating to redness, we prevent the formation of the scale, and the steel comes from the water clean and of a gray color. In tempering the same, by holding the edge or point upon a piece of cold steel, or in a drop of water, the advance of the color is somewhat retarded, and we are more easily enabled to check it at the exact point required.

There is no rule for the regulation of heat in tempering which will apply to all cases, since the amount of heat necessary for the production of a given temper varies with the different qualities of steel. Great care should be exercised that the steel be not overheated, as the effect is permanently injurious; by repeated hardening, its character is also deteriorated. Hammering should be resorted to between each hardening. The effect of this process is to restore to the steel that fibrous condition which has been lost by the crystallization consequent upon the sudden withdrawal of its heat.

MICROSCOPY OF THE TEETH.

(Continued from page 252, vol. ix.)

BY S. P. CUTLER, M.D., A.E.G., D D.S.,

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I HAVE spoken of the process of exodontosis internus as a mixed process, or perhaps, more properly, a physiological one, the result of wearing down of dentine causing injury and wounding to tubuli, and consequently nerve fibres. This might be regarded as an accidental cause, and does not happen until the tooth begins to wear.

This wearing causes irritation of filaments, and in consequence a deposit of lime salts betwixt the pulp proper and dentine. This process could not be brought about unless there was an excess of lime salts deposited—that, too, outside of the pulp. These salts could get there from no other source save that of the pulp—the pulp then would have to furnish materials for this process. How could this take place except that of secretion through or rather excretion from the pia mater dentalis, by a process of osmosis or osmotic action from the capillaries of that membrane absorbing the materials from the blood by a sort of elective affinity? a plus amount of os plasma at the assailed point ossifying inward and downward so as to give sufficient depth to dentine to protect the pulp from the action of foreign bodies and thermal changes (as the dentine is a non-conductor), and from mechanical violence by pressure or springing of the bone down on to the pulp.

As the process advances, the pressure on the pulp from the hardening of the new bone causes the nerve to absorb sufficiently to keep out of the way of pressure, which would otherwise take place to such an extent as to cause intense suffering, which, however, is the case to a certain extent in certain cases. As has already been said, when this process is too much hurried, death of the pulp takes place from inflammatory action caused by pressure from without. The remedy is rest until the uneasiness subsides. Whether or not the dura mater dentalis is all carried away by absorption by this process is not yet settled. So it is, there seems to be a bony union more or less complete. In this process the nerve filaments are intact, the ossific process following them down, pressing away the pulp. This pulp membrane having openings where the filaments pass through, readily slips down from pressure as the bony matter accumulates around them. As this process is more or less a continuous one, I do not think there is any well-developed dura mater dentalis covering this new formed dentine, at least so long as the process is progressive, though the inner surface appears well defined and regular. When this process becomes permanently arrested from

any cause, it is reasonable to suppose that there is a membranous covering formed on the new formation (à posteriori).

At all events, these views will answer my purpose until more reasonable ones are advanced to take their place. I do not say that these views are above criticism or are entirely sound in their logic, but it is a new subject which has had but little light thrown upon it by any one, though it has been written about ere this. (See Tomes' Dental Surgery, 1859.)

The above remarks are not advanced fully as scientific certitudes, but as probable and reasonable hypotheses. The other form of ossification of the pulp cavity that has been spoken of is, I regard it, a different process, depending upon an entirely different cause, and might be regarded as a pathological one, depending on a diseased condition of tooth—that is, decay. There may be cases where other causes might produce the same condition of things; it might be the result of sympathetic irritation, jars or disease about the alveolæ, and perhaps other causes not thought of as yet. I have seen this process commenced before the decay had reached the nerve cavity, but sufficiently near to cause slight uneasiness at times. One instance of the latter character came under my own observation recently—the tooth, an upper wisdom, had given continued but slight uneasiness for some weeks, but did not give pain by probing. On extracting the tooth, there was found an ossified portion of the pulp of one of the fangs which was rather large at that point. The process commenced near the apex, and continued up for ¼ of an inch, filling the canal almost completely, only on one side there being a small aperture past it. This ossification was circumscribed and oval in shape, perfectly smooth and hard; the balance of the pulp normal; not much signs of inflammatory action. There are other cases that have recently come under my observation where ossification had commenced at more than one point, then running together, forming an irregular circumscribed region, not in some instances reaching to the pulp membrane. In other instances I have met with cases of molars where the entire pulp was ossified down to the fangs, and a short distance in some instances down them; have not yet met a case where the process had extended down in all the fangs to the apex, though extended observation may in future find this to be the case.

Further observation is needed, as I regard this as a very important point in dental pathology.

In many instances the silting up or petrifying process commences immediately under the seat of the decay. If this can be regarded as a salutary or saving process, it is but reasonable to conclude that nature, or the vis medicatrix naturæ, would commence her reparations at the vulnerable point or points of attack first, and then extend as the necessity might demand. I would right here inquire, what about killing such

nerves or attempting to extract them? Would it not be advisable, under all circumstances, to endeavor to ascertain whether any such process had commenced, and if so to try and aid her in her efforts rather than to attempt to baffle nature in her salutary intentions?

There is much to learn concerning this important point in dental pathology. Many cases, in my judgment, might be successfully treated that are being lost.

(To be continued.)

THE STRING DAM, OR FILLING APPROXIMAL CAVITIES.

BY A. P. STEVENS, PORTSMOUTH, N. H.

HAVING suggested to one of the professors of the Philadelphia Dental College a method—new to him—of suppressing the secretions by the application of a string dam in filling deep-seated and complicated approximal cavities, he assured me that it would make the basis of an acceptable article to one of our journals. I hasten therefore to extend it to the profession, conscious of the wrong I have done, in years gone by, in being only a receiver, never a giver. To the point. I will first preface by saying that so beautiful and uniform has its action become in my own practice, that I never fill an approximal cavity without it; but for better illustration I will select one of the most difficult operations a dentist has to encounter in this branch of his art. A patient presents himself with a large irregular cavity in the back approximal surface of either the second bicuspid or first molar, one where the decay takes in the larger portion of that surface, and extends a considerable distance under the gum (we often meet such in pulp cavities), and where the soft parts between the teeth have become excited to an unhealthy action by the constant irritation of the sharp edges of the decayed tooth. Now, again, I want to preface by saying that I am only writing for the benefit of that class of our profession who properly appreciate what is due to their own manhood, to their patients in so confidingly trusting them, and to the character of the operations they are called upon to perform. I am well aware that a large class of dental operators will, after having read thus much of my communication, exclaim, What is this all about? I can fill just such a cavity in ten minutes (after it is prepared) with as many pieces of gold, and keep it perfectly dry without napkin or dam, or so fill it as not to let the moisture injure it. I would reply, that I am not writing expecting to benefit such persons, but only for that class of diligent inquirers who eagerly grasp at the most minute evidence that can help them in solving these vexed problems, and who do not believe that such cavities as I have mentioned can be properly filled with ten

pellets of gold, or ordinarily in three times ten minutes, but who do believe that ninety-nine out of every one hundred cavities can and should be filled without any other moisture than that which the condensation of the vapors of the breath makes unavoidable. With the above digression, I will now proceed. The first work, presuming the general character of the mucous membrane of the mouth to be in a fair physiological condition, would be to open to the cavity, which I always do with a V-shaped file, making the space just sufficiently large, more inwardly than outwardly, to insure success in attempts at cleanliness after the operation is completed; for further room for vision, and ease at operating, I cut from the crown, as it is absolutely essential that every portion of the cavity should be completely under the eye. If, in attempting to reach the extreme outer edge of the cavity under the gum, I find the irritated portions and the festoons of the gum troublesome, I carefully dissect such parts away, apply a tent of flax, moistened with an astringent, and dismiss my patient for a week; at the end of which time I find the healing process so far complete as to admit of rapid manipulation in shaping the cavity without much danger of scarifying the membrane; but ordinarily I do not find this precaution called for. On the manner of forming the cavity I need not dwell, but would most earnestly suggest to inexperienced operators that too much care cannot be given the more obscure margins, to prevent weakness and recurrence of decay.

The dam is formed of strong linen twine, a little larger, in most cases, than the fancy colored wrapping-cord used by stationers and druggists (one needs several sizes in general practice), and before using is to be thoroughly waxed with a compound formed of one part rosin and two parts yellow beeswax. This gives to the twine a smooth, hard surface, not easily acted upon by the secretions. Now, to make the application of the dam clear, we will settle upon the second superior bicuspid as the one to be operated for.

The twine in this case is to be very lightly tied about the neck of the first molar, and is to be accomplished by first probing an opening between the necks of the first and second molar, and then introducing the end of the twine, and working it through and around the tooth in question, tying upon the buccal side; when cut close to the knot, and one-half the dam is in position, the other half is formed by affixing the twine around the tooth to be filled, when, after gently but firmly pressing both portions beyond the margins of the cavity, the whole is complete. The advantages of this dam may be thus summed up. It has no elasticity like rubber, but will remain where it is placed. It can be used where rubber cannot. It will not absorb the secretions like cotton or muslin, and thus in its turn become a source of trouble, but from its waxed surface will quite effectually repel them. It can be made to firmly press upon the membrane surrounding the teeth, and thus actually close up the thou-

sand gaping mouths that otherwise would inundate your work with their contents before its completion.

In conclusion, I would say that I have often kept such cases as I have dwelt upon perfectly dry for upwards of an hour and a half, where without the dam I could not possibly have managed to do so for one-quarter of the time.

ANÆSTHESIA CAUSED BY DENTAL IRRITATION.

BY HENRY S. CHASE, M.D., D.D.S., ST. LOUIS, MO.

Mr. A., aged eighteen, in vigorous health, called for the extraction of the left under second bicuspid. There was pulpitis and a worthless crown. The tooth was quickly extracted. Coincident with the removal of the tooth a pain shot down the left arm, and complete anæsthesia of the whole limb, including the hand and fingers, followed, lasting about five minutes. There was *no* loss of *motion*. How beautifully *facts* in Physiology or Pathology illustrate functions!

The inferior dental nerve is a sensory nerve, and communicates its sensations to the sensory nerves of the arm through the otic ganglion, the cervical portion of the great sympathetic, and the brachial plexus, by reflex action.

In a physiological condition of the nervous system pain will be felt usually at the point of lesion or production, but in abnormal or pathological states the sensation of pain may be felt in a very remote organ.

All dentists have seen this exemplified in the teeth, the wrong one being pointed out as the seat of pain and the subject for an operation.

ROOT FILLING.

BY A. HOMER TREGO, PHILADELPHIA.

I am unable to discover any advantage gained by the process adopted by the author of the article upon the above subject, which appears in the Dental Cosmos of November, 1867.

Wherein the advantage of the "wood" and "cotton?" Refer to page 243, same number of Cosmos. How can one *be certain* that the *timber* follows *all* of those canals? And how obtain the *proper dimensions* to effectually close the apex of the root? If effected *by mere accident*, does the "wood and cotton" prevent imbibition, percolation, etc.? *No!* for the "paste" will not adhere to the wood, and *will not be sure* to fill the intermediate space.

In more than half the cases the results will be imperfect.

With accessible cavities, the canals may be enlarged to suit convenience; but in difficult posterior cavities, in molars and bicuspids, the

operator needs a substance which he can *rely* upon going just where he wants it, and which he *knows will entirely exclude all moisture and gases.* "Hill's stopping," warmed, superficially saturated with chloroform, and skillfully manipulated, *can be relied upon.*

The creasote, of course, tends to prevent the wood from decomposing and doing mischief. But will the brother inform us *why* he "always leaves 'more than a smell' of creasote in the canal?" What would he think of a surgeon who would hermetically seal a cauterizing antiseptic in any other part of the organism?

Having removed all foreign matter from the canal, and inflammation from the surrounding parts, *why the necessity* of the creasote? If you *have not so removed the difficulty,* are you justifiable in closing the cavity?

PROCEEDINGS OF DENTAL SOCIETIES.

NEW YORK ODONTOLOGICAL SOCIETY.

BY W. C. HORNE, NEW YORK, N. Y.

The regular monthly meeting was held at the residence of Dr. E. A. Bogue, November 12, Dr. C. E. Francis presiding.

After the usual routine business, Dr. Horne read the following essay on the topic set apart for the evening's discussion:

THE PHYSIOLOGICAL RELATIONS OF FOOD TO THE DENTAL ORGANS.

The subject which we have set apart for our deliberate attention this evening is one which none of us makes any pretension to having measured. It is conceded to be one calling for accurate and extensive observation, not vague and indefinite assertion, such as we hear so much of in respect to various dental operations, illimitable in its importance to our profession. Physiology, as now understood, is a science of modern origin, to which additions are being daily made by well-qualified investigators. The great advancement within the present century in knowledge of the construction and functions of the organs of life is due mainly to the revelations of the microscope; without its aid we would be obliged to grope our way through darkness, as did previous generations of investigators. While it requires a lifetime of preparation and study to reach distinction in the walks which have been adorned by the researches of such savans as Virchow and Kölliker, and which the duties of an active professional life and the lack of suitable collections put beyond the possibility of attainment, even where the disposition may exist, yet it is the duty of every student to avail himself, so far as he can, of the light which has been thrown upon the path in which he daily treads.

It is desirable, in considering our subject, to have in mind what are the constituents of the teeth, and the periods during which their character is most readily affected. Premising, then, that they are modifications of the mucous membrane of the mouth, and constitute an important portion of the alimentary system, we proceed to note their periods of development. The origin of the dental papillæ is placed at the sixth to the tenth week of fœtal life; by the fourth month the pulps of the milk teeth assume the form of the future organs, and shortly after the pulps of the permanent teeth begin to be formed; by the seventh month ossification is commenced in the milk teeth, and continues, extending gradually to all the others, so that in the sixth year there are forty-eight teeth coexisting in the two jaws, including all of the milk-teeth and the permanent ones, with the exception of the wisdom teeth. This process is especially active up to the time of the eruption of the permanent second molar; and hence it is indispensable that an abundant supply of suitable pabulum should be furnished up to this period.

The chemical composition of teeth of a proper texture is 20 to 30 per cent. cartilage, and 60 to 70 per cent. inorganic matter, chiefly phosphate of lime. The organic basis may be obtained by treating the teeth with hydrochloric acid, and is readily changed by boiling into gelatin. In the enamel, the organic matters are found in the small proportion of 6 to 94, while in the cement the relations are 30 organic to 70 inorganic. It would be a source of great instruction to obtain by analysis the relative proportions of organic and inorganic constituents in teeth of different textures, noting their liability to decay, and the hygienic circumstances under which they had been developed. We have abundant evidence of a general sort, that the rapid decay, so common in the teeth of our countrymen, is due to defective nutrition, but no data upon which to establish a certain course of improvement.

In every animal solid or fluid, there are present, in certain proportions, the substances which enter into its composition, called proximate principles; they never exist alone in any part of the body, but are so united with each other that the mixture presents a homogeneous appearance. But this union is of a complicated character, and the presence of each ingredient depends to a certain extent upon that of others. Some are held in solution by water, some by other substances. Thus phosphate of lime is held in solution in the blood by the albumen, which is fluid by its union with the water; but in the teeth it forms a solid substance with the animal matter of that tissue, giving them their proper consistence and solidity.

The proximate principles of an inorganic nature are very numerous; they occur abundantly in the different kinds of food and drink, and are necessary ingredients of the food, because they are necessary to the animal frame.

The blood may be regarded as a nutritious fluid, holding in solution all the ingredients necessary for the formation of the tissues, the inorganic matter being mostly taken up from the ingredients of the food unchanged, and transferred to the particular organs which need them. Given, then, sufficient nutritious food, with the digestive organs in the healthy performance of their functions, the blood will supply all the parts of the system with their proper aliment. But if the nutritive processes do not go on in a healthy manner, and the general system is not in good condition, the teeth will suffer for lack of the inorganic constituents which they need. The fact that they are not perfected up to the age of adult life, impresses the importance of using all the means which dental science and art supply to preserve them to an age at which an improvement might be hoped for in their structure.

The cases which indicate a lack of supply of the hard constituents are so frequent, that they must be common to every practitioner. A class in which this defect is most strikingly apparent, is that in which the temporary teeth and the first of the permanent which appear are pitted on their surface, while those succeeding show a greatly improved condition. (The prevalence of eruptive diseases during infancy is generally found coincident with such conditions, and that they have mutual relations, is more evident than just what those relations are.)

In the young subject, the development of the hard tissues is in excess of absorption, and their density is consequently on the increase; in middle life the two powers balance each other, under ordinary circumstances; while in old age the absorbent action appears to preponderate.

The substance of the perfect tooth, though hard, is by no means incapable of molecular change. The functions which in the bones and cement are performed by the lacunæ and canaliculi are, in the dentine, carried on by the dentinal canals, and the fissures between the prisms of the enamel. According to Prof. Kölliker, all these cavities during life contain a nourishing fluid, derived on one side from the pulp, on the other from the periosteum, and permit of changes, though slow, in the tooth substance. Whether this view, or that of Mr. Tomes, that the dentinal tubuli are occupied by fibrils, be accepted, the nutritive function in either case is unquestioned. Taking for granted, then, what is admitted by every observer, that the condition of the teeth varies at different ages, and under different conditions of nutrition, it is also evident that the same qualities of food fail to supply to different individuals a like amount of pabulum. This can be readily accounted for on the ground that the powers of digestion or assimilation are in the one case inadequate.

It is necessary for the harmonious development of the various organisms of the body, that the foods supplied should abound in those con-

stituents which may be required; and taking into consideration the nature of the dental organs, and the very slow and partial degree to which they can be affected, we cannot but arrive at the conclusion that the most important period for determining the future character of the teeth extends over the whole time of their development previous to eruption. If hygienic efforts can be made available for the improvement of dental structures, it is during the formative stage that they should be most successful. Not only do we need, however, to supply proper nourishment to these embryonic structures, but there must exist in the organs by which they are supplied the necessary power of assimilation, and at this point a long train of antecedent irregularity or weakness may prevent the attainment, in the case immediately in hand, of the most desirable results, or, indeed, of any commensurate with the desires or efforts of the experimenter; but this defeat may indicate that other causes lie further back than those which have been grappled with.

The whole question of physical development is thus opened up to us. In order that strong teeth should be developed, the whole system must be in good order. To produce healthy offspring, healthy parentage is indispensable, and any effort made to improve the general health, or to develop to an especial degree any set of organs, must be conducted with skill and judgment, accompanied by a perseverance which will not be discouraged by the failure to produce immediate results.

How can we expect to produce immediate improvement when the causes which underlie the defect are traceable through generations of vitiated nutrition? "The true rules for a sound and healthy stomach are to eat when hungry and to drink only when nature requires it." Is this the habit of most people? How many occupy themselves whenever opportunity occurs in eating, and in drinking water or worse liquors? The stomachs of such are never at rest, a continual disquiet is kept up, and all tone and vigor is lost. The character of our food, too, is generally improper—young meats; hot breads, made of the finest flour, and raised with saleratus; unripe and stale fruits and vegetables; pastries; sweets in excess; all tend to disorder digestion and starve the system. If people would have their children enjoy good teeth, let them take care of their own food and drink, clothe themselves warmly, and have plenty of exercise and fresh air, then the next generation will have a better start, and be trained to better habits.

This subject is receiving more attention than ever, and some good will doubtless arise from its agitation, if we keep it up. We can impress upon the minds of those who rely upon us for professional counsel, the importance of giving the first attention to the laws of health. We may stimulate one another to experiments and observations, which, though fragmentary, will, when brought together, add greatly to our stock of knowledge, and to our power for usefulness. I need hardly

say, in conclusion, that I have not offered you any chimerical notions, but the views, so far as I am acquainted with them, of men who are recognized as leaders in the branch of investigation immediately under consideration.

Dr. Bogue, the appointed essayist, followed upon the same subject.

He said he should be exceedingly glad to present an *original* paper upon the subject under consideration, but as that was from the nature of the case quite impossible, he had brought but an abstract of the views of certain laborers in this special field, so arranged as to present in the few moments necessary for its reading, some of the more salient points touching the "Physiology of Foods considered in their relation to the Dental Organism."

Leaving out of question the carbonaceous or heat-giving class of foods, such as sugar, starch, and fatty matters, and the medicinal foods, such as the stimulants and narcotics, we will direct our attention first to the nitrogenous or nutritious foods—albumen, fibrin, and caseine; and secondly, to the mineral portions of food necessary to a healthful condition, and in a certain degree necessary to life itself. Carbon, hydrogen, oxygen, and nitrogen are found in all the tissues comprising the vital organs, or assisting to perform the functions essential to life, both in plants and animals. According to Lankester, "the *vital* organs of the human body are renewed about every forty days," on the ground that in forty days we consume an amount of food equal in bulk to the mass of our bodies, and this must have passed away to make room for the new matters. Now to supply this waste, we must receive all the required elements, or else we are left in an unnatural and unhealthful condition, predisposed to disease, whether of a contagious nature or spontaneously arising from the deficiency, as is so markedly seen in scorbutis. First, then, albumen, the material of which the nervous system is in large part composed; this nitrogenous element of food is an essential to our conscious existence, as by means of the nerves we are put in connection with the external world; by it we think and feel, taste and see, and upon the condition of the albuminous portion of the system rests our consciousness.

Aside from the egg, where it is found in largest amount, and not in combination with other substances, we find albumen in the blood of animals; in their nervous systems as in ours, in wheat and in rye; and we find, moreover, that the gluten of wheat is almost analogous to the fibrin of the blood, and both are susceptible of being changed into albumen by the action of the stomach, so that we are guarded in various ways against the danger of this element in our diet being left out by us. Nevertheless, we waste it in various ways. First, often by cooking our eggs so hard, that in their "resolution portions are wasted;" next by putting our beef and mutton over the fire in water that is below the

boiling point, when a large proportion of the albumen exudes not only, but the creatine, and the gelatin which acts probably as a diluent, also; and then instead of saving this water for soups, a form in which these useful elements could be easily appropriated, we often throw it away, as we also do the water in which vegetables have been cooked. Again, by the use of alcoholic beverages but slightly diluted, which precipitate the albumen if in solution, and necessitates doing the work of solution over again by the stomach, before it can be applied to building up the waste places. Secondly, fibrin, which constitutes the muscular portion of animal tissues. This substance is equally necessary with the albumen to us, and is procurable in vegetable food, but more easily in animal. As before stated, we have in wheat a substance almost identical with fibrin,—gluten,—but in animal food we have a combination of all the elements really existing in our own organisms, and so more nearly adapted to our use. It need not be supposed, of course, that the most nutritious substances alone are to be sought as food, for dilution and distention are necessary. Horses fed on grain alone are not in as good condition as those which have chaff or straw mixed with their grain; yet there is no nutrition worthy of mention in these substances, and here comes in one of the strong arguments for the use of Graham bread, or bread made from the entire substance of the grain. Granting that the largely increased amount of nutritive matter contained in such bread is not needed, yet the presence of the cellulose gives dilution, greater facility of digestion, *and* mineral matter (of which mention will be made hereafter), all of which are important to the health of the individual. We find that the flesh-eating nations, as well as flesh-eating individuals as a class, being guided by their instinct, if by no other motive, surpass those who live on a purely vegetable diet. Again, those who argue for a vegetable diet, allow milk, butter, cheese, eggs—all animal products, all containing the flesh-forming elements, except the butter, that being the fuel; and to so great an extent do these self-styled vegetarians live on animal food, that Dr. Carpenter calculated from an examination of a vegetarian "Cook Book," that the proportion of animal food consumed by those who lived in accordance with the rules of this book, was half an ounce per day more than he himself or any member of his family consumed, and he is not a vegetarian. Without going into the minutiæ of detailed reasons, therefore, we may safely venture to affirm, that the most careful deductions of science at the present day point to a mixed diet of animal and vegetable food, so prepared as to retain so far as possible all their constituent elements for our consumption, that by these means we most easily and surely repair the waste of nerve tissue, muscular tissue, and finally of bony tissue; to which, as more directly bearing upon our present subject, we will now turn our attention.

A man of 154 lbs. weight contains, it is computed, 111 lbs. of water,

8 lbs. 318 grs. of mineral matter, and the remainder is the organic matter, which may be separated again into ammonia, sulphuretted hydrogen, phosphoretted hydrogen and other gases. This mineral matter is distributed about as follows (I use Lankester's tables as authority):

	lbs.	oz.
Phosphate of lime, principal part of the earthy matter of the bones......	5	13
Carbonate of lime also entering into the composition of the bones..	1	00
Fluoride of calcium found in the bones..	0	3

	oz.	grs.
Chloride of sodium..	3	376
Sulphate of soda..	1	170
Carbonate of soda..	1	72
Phosphate of soda..	0	400
Sulphate of potash..	0	400
Peroxide of iron..	0	150
Chloride of potassium..	0	12
Phosphate of potash..	0	100
Phosphate of magnesia..	0	75
Silica..	0	3

Now, following my above-named authority a little further, we recognize without difficulty the fact that few of those engaged in the preparation of food for the table, have any idea of its proper constituents, or even think of asking whether the right proportions of the mineral matters exist in the food undergoing preparation to secure health. "Yet without these babies get rickets, young ladies acquire crooked spines, fathers get gouty, mothers have palpitations;" and to this we may add that each and all of these have greater liability to defective teeth, soft, more highly organized, deficient in coherent crystallization, superabounding in animal matters, and within a certain range of consanguinity, there is a liability to defective palates, hard and soft, and to hare-lip; all of which may at some time be found to be due to a defective supply, or defective appropriation of mineral matter in the food; and should this be the case, will be to a much greater degree than at present subject to remedial influences. Experiments have been tried upon the lower animals by feeding them upon the flesh-forming materials alone, such as caseine or butter, or cooked meat without the mineral matter—which amounts to only 1 part in 100, and they die; in short, feed a dog on everything except the mineral matters, and he dies all the same. Yet many persist in using only refined sugar and the whitest of flour, in throwing away the liquors that meat and vegetables are cooked in; and only a few weeks ago we were told in an association ostensibly gathered for scientific investigation and discussion, by a physician who is advocating what he regards as a needed reform in diet, that common salt was injurious to bread, and that *he* had no doubt that it was injurious to the system in any form, that he never used it, and believed that owing

to his peculiar diet, he could outlift, outwork, outrun, outdo any person present—a statement not at all at variance with the theory herein advocated, that the brain as well as the muscle needs the reparative processes of proper foods in order to do its work well.

By recurring to the table mentioned above, we find that salt—chloride of sodium—stands third in amount upon the list of mineral constituents of the human body, 3 oz. 376 grs. being the amount found in a man of 154 lbs., and all of this salt existing in the blood, which, when in a depraved condition, predisposes to colds, inflammations, contagious affections, and so on as before stated; and the fact that we often see a number of persons exposed in the same way and to the same influences, of whom part are unharmed and part affected, ought to teach us to regard the proper constituents of the blood, which is our "life," as of the greatest consequence to our physical well-being. But to return to our subject. "Salt determines the life and forms of both plants and animals in the ocean," says an able writer, and truly if we could turn the ocean into a vast fresh-water reservoir, we should no longer see the salt-water plants and animals flourishing in it; they would give way to the species found in the fresh-water repositories; so finding three drachms of salt to the gallon in the blood of man when in a healthy condition, we may expect that if we attempt to vary that proportion, our only success will be at the expense of the well-being of the subject of our experiment, for we are not wiser than our Creator. Now as to the use of salt in the system. It facilitates the absorption of water by the system, it prevents the permeation of the walls of the blood-vessels by the blood. It is claimed by some physiologists to be of importance in supplying the chlorine from which is produced the hydrochloric acid always present in the gastric juice, and it appears in some hitherto unexplained way to promote certain beneficial changes in the system, of which an example has been furnished by a French chemist who fed a number of oxen without salt, and a corresponding number in precisely the same way, only with the *addition* of salt; at the end of a month, the salted animals were sleek and well-looking, the others rough-coated and ugly, and at the end of two years the former were well, the latter sick. Next we find in this table 5 lbs. 13 oz. of phosphate of lime. We find also several other phosphates, soda, potash, magnesia; and we find the acid of these salts free in many parts of the system—we must therefore have them, and have enough of them. Yet if we get a superabundance, they do not pass off through the secretory ducts without harm, as chloride of sodium does, but are very apt to produce disease. We get our supply, or may get it largely from the cereals, of which wheat is *our* staple, the outer portions of the grain being the source of the most abundant supply; yet this is generally the rejected portion, and it is this very element that the grain abstracts from the soil for our use

that, as we say, exhausts the soil, so that grain crops will not grow in paying quantities without a fresh supply of the phosphates in the shape of manure with it in solution. Liebig states that probably one of the causes of the destruction of the great cities of antiquity, was the exhaustion of the phosphates in the soils in their immediate vicinity, and it became cheaper to migrate to a portion of the earth where food would grow, than to grow food and bring it to their great cities at a distance. Now, one thing more in reference to our daily practice, and I will draw my already too lengthy paper to a close. Water-cresses, lettuce, chickory, celery, etc., etc., are often looked upon as of small consequence in our foods, nay, are even regarded as luxuries by some. Now these things contain the salts of potash, and should be taken that we may have our due supply. The same reason may be given for the use of fruit raw, and in its natural state upon our tables daily, and a little attention on the part of those acting, even in a subordinate capacity, as public educators, would assist in giving to our people, who, of all the world, are best supplied with the raw material of food—"the manufactured article," so to speak—food properly prepared, both medicinally and as regards nutrition and heat, so that in every direction our nation may cease to become physically degenerate, and that the portals of the countenance may disclose no more deformity, but as it were pillars of ivory in settings of coral.

After a general and exceedingly interesting discussion of the views set forth by the essayists, the Society adjourned to the second Tuesday in December.

DISCUSSIONS OF THE SOCIETY OF DENTAL SURGEONS OF THE CITY OF NEW YORK.

BY J. S. LATIMER, D.D.S.

April 10th, 1867.

Prof. R. K. Browne lectured before the Society on the Physiology of the Blood, in which he asserted that the red blood corpuscle has no pellicle or distinct cell-wall, as has been claimed for it. He also announced that the velocity of the red corpuscle is many times greater than that of the liquor sanguinis in which it moves. (This lecture has already appeared in print.)

Dr. Woolworth, of New Haven, by invitation, read a paper prepared for another occasion on the wants of the profession, and entitled "What Next?"

Dr. Atkinson, the regular essayist for the evening, read a paper on "The Physiology of the Blood."

May 8th.

Prof. Browne gave his second lecture on the Physiology of the Blood and Circulatory System. The lecture was interesting and instructive, but as it has been already published, it need not appear here.

May 22d.

Dr. John Allen read an incomplete paper on Pathology of the Blood, which was highly instructive in the direction of the influence of foods and modes of life on the health of man. The doctor was requested to finish his paper and read it again at his convenience.

C. P. Fitch, M.D., said he did not know much about the subject, and doubted if anybody else did. He believed that as nutrition is extra-vascular, so disease is extra-vascular.

Experiments have seemed to prove that the red globules are increased in number in the liver, though the amount of iron is diminished.

Equipoise of the assimilating and eliminating processes is essential to health.

J. S. Latimer said he believed Dr. Fitch had entirely underrated the pathological knowledge of this body. When hardly a matron in the country is devoid of *some* knowledge of the blood and its diseases, it would be unreasonable to suppose a body of men whose business it is to deal with disease, would be quite devoid of such intelligence. Anæmia and hyperæmia—too little and too much blood—are pathological conditions. Who of us does not at once recognize these departures from health?

In some cases of insanity, the fibrin seems to be in excess, the blood so sluggish in its circulation and coagulating so rapidly, that only with great difficulty can blood be removed from a vein.

Again, we have blood-poisoning from mortification of wounds, miasmatic fevers and jaundice, with hundreds of other diseases consequent on the introduction of poisons into the blood. Of these facts every gentleman present was aware. If it was meant that we are not able to go to the bottom of all these pathological conditions and put them in scientific array, then the doctor was right perhaps.

June 5th.

Dr. Atkinson read a paper written by Charles P. Grout, on Taking Impressions, the subject of the evening.

The following is the substance of the paper:

I first examine the mouth thoroughly. The cup is then selected. If for a partial case, the cups with sides at right angles with the bottom are preferable. Next comes the preparation of material. For cases in which the teeth have been very recently extracted, plaster is preferred, but for those in which the process and gum are well, I should employ

wax or gutta-percha from preference. White wax is preferable to yellow on account of its greater neatness, and because it becomes firmer and in a shorter time.

The wax is softened in the flame of a spirit lamp (not in warm water), care being taken not to melt the edges. When well softened, it should be kneaded between the hands, making it into a roll and pressing it into the warmed cup, through a hole in the centre of which a string has been passed, having a knot on the end next the wax. Draw the string through until the knot is on the level of the upper surface of the wax, then spread a drop of sweet oil over the surface of the wax with the finger, and we are ready for the operation. Carrying the cup to its place in the mouth, we hold it steadily in position with the left hand, while, with the forefinger of the right, we raise the lip and press the wax well against the teeth and gum. A few moments suffice for the hardening, when we withdraw the string and the impression falls or is detached with slight force. It is said that a teaspoonful of Venice turpentine to a pound of wax is decidedly advantageous, but I have not tried it.

J. S. Latimer said that some ten years ago he saw an impression taken with plaster in a way that made him think rather poorly of the material and the method. The patient was placed in a rocking-chair, the head thrown back and the thin batter placed in a cup and pressed against the roof of the mouth. Of course a very large proportion of the plaster ran into the fauces, to the great discomfort of the patient, who received an additional aggravation in the assurance that only eight minutes would be required for the hardening of the batter. Very great improvements in the management of plaster have been made since then, and we now slowly add the plaster to the water, giving time for the air to escape; stir carefully until all air-bubbles are removed and the batter is beginning to set, when the patient's head is thrown well forward to prevent any excess from getting into the fauces, and the impression is well taken in about one minute from the time of its introduction.

He generally employed Franklin's method for partial cases. This consisted in taking first a wax impression, which is hardened and then cut out to the depth of about the $\frac{1}{16}$th of an inch on that part of the surface which it is desired to cover with the plate, except next the teeth where a wall of wax is left about the $\frac{1}{20}$th of an inch in thickness.

Well-manipulated plaster is then carefully placed in the depression thus made in the wax, and the second impression taken, which should be removed as soon as fragments from the bowl break with a sharp fracture. Acting on a hint from Wm. H. Allen, he no longer oils the impression, but varnishes, and then wets it before pouring the cast.

A. L. Northrop, D.D.S., prefers plaster; rarely uses wax, and has employed gutta-percha but once—then he had the misfortune to burn the patient's mouth.

Dr. Fitch remarked that every man should use discrimination; that wax might be better for some cases and plaster for others. He generally prefers plaster because it does not displace the softer parts.

In taking a wax impression, he would not carry it up on a line with the front teeth, but perpendicularly to the centre of the arch.

J. C. Robbins had been troubled to get good impressions for partial cases for the lower jaw; had taken the impression in wax, and from this made a vulcanite cup with which to take the impression in gutta-percha. He had thus succeeded. Sometimes he uses gutta-percha alone; generally employs plaster colored with a little rose pink, and prefers it.

B. W. Franklin thought it time to thoroughly discuss this question when gentlemen say they know of nothing superior to white wax for taking impressions. Many do not mix plaster correctly. It should be fine, added to plenty of water, and thoroughly and skillfully manipulated. If the patient is subject to emesis on the introduction of the cup, he soon gets the patient used to the presence of foreign bodies and well able to endure them by titillating the fauces with a feather. He believed more bad work would be done during the next five years than during the past five, for the reason that it is being driven into incompetent hands. Teeth are being inserted for from fifty cents to one dollar each, and the best results can never be attained for such prices. If we would elevate the profession, we must put the lever under both branches, and then work with a will.

Dr. Atkinson did not think we were retrograding. The proportion of good work is larger and better than ever before, and the operators who once stood "A 1" have to look to their laurels or take back seats.

June 19th.

Drs. Lyon, Atkinson, and Fitch favored the division of the Society into sections, for the better advancement of investigations.

Dr. Atkinson spoke of the importance of clinical instruction for the benefit of young practitioners. Either give public clinics in the eleemosynary institutions of New York and Brooklyn, or in our own offices. He had, for two years, clinics every Monday morning, and he could continue them. Others could do as much, and thus the car of progress would be advanced. The country is full of dead pulps and defective mouths for the want of such instruction.

W. B. Hurd, D.D.S., spoke discouragingly, and prophesied that none of these good resolutions would be carried out.

Adjourned until September 12th.

September 12th.

Dr. Angell, of California, by invitation, made some remarks on bread, in which he claimed that bread raised by fermentation is comparatively innutritious when stale, and if eaten fresh, fermentation will recommence. He objected to the use of salt in bread, not only because it is a non-essential, but because it produces an unnatural thirst and craving for fluids; believed he could do more work with one meal a day than any man he knew with four meals seasoned with salt.

He exhibited some biscuits made of a batter of flour and water baked quickly and made light by the conversion of the water into steam. He believed we ate too much flesh, and expressed the opinion that portions of flesh decomposing between the teeth is a prolific cause of dental caries.

B. W. Franklin had made bread as described, and liked it. He knew people who could not eat the ordinary bread when it was warm without subsequent suffering, but who ate with impunity of warm biscuits made of flour and water only. He did not believe man was intended to be carnivorous.

John B. Rich said that the English had found that children require animal food. He had a dislike for salt. While with the Arabs he subsisted on rice and water, not tasting butter until he was twenty years of age. Many systems require large proportions of animal food, as he had observed while engaged as a physical trainer. Some could not keep well without the richest animal food three times a day; notwithstanding this the Arabs rarely eat flesh, and yet are able to endure great hardships and fatigue.

John Allen, D.D.S., favored unfermented bread, and claimed that it should be made from unbolted flour. We should take plenty of outdoor exercise if we desire health. People who live naturally have no need of dentists, as was testified by Humboldt.

Dr. Fitch said some systems required animal and others vegetable food. No man can reasonably or profitably lay down rigid rules for the diet of mankind.

Dr. Atkinson claimed that man's conformation and history show him to be omnivorous.

(Of the meeting of September 26th [subject, "Improvements observed during Vacation," John M. Crowell, essayist] I have been unable to obtain any account, hence a hiatus.)

October 9th.

John Allen said facial neuralgia was generally caused by bad teeth. He had cured it with quinia when it arose from malarious poisoning.

B. W. Franklin said we all knew neuralgia was a scapegoat for the consequences of pernicious excesses He mentioned a case in which the cause was periodontitis.

John M. Crowell had suffered from neuralgia, and was cured by the administration of aconite and belladonna alternately.

John S. Fiske thought the excessive use of tobacco a prolific cause of neuralgia, and doubted if diseased teeth ever produce true neuralgic disease.

John Allen said that the greater proportion of the sufferers from facial neuralgia are ladies, and they do not use tobacco. He believed ninety per cent. of this disease is due to defective teeth.

O. A. Jarvis believes true neuralgia is generally associated with distorted or hypertrophied osseous structure. He had suffered pain in the teeth when the cause was a disordered stomach.

C. E. Latimer, D.D.S., said people resident in malarious districts suffer from neuralgia on the slightest local provocation. Mentioned the case of a lady of scorbutic tendency who came to him suffering from this disease. He found an exposed pulp, which he devitalized, and then sent her back to her physician for general treatment. In one case a lady had been vainly treated by subcutaneous injection with salts of morphia, and when she came to him was carrying horse-chestnuts in her pockets to charm the pain away. Tobacco, or anything else which has so powerful an effect upon the system, may be the indirect cause of neuralgia.

J. S. Latimer spoke of one case in which a lady suffered excruciatingly from facial neuralgia, caused, undoubtedly, by syphilitic poison received from her husband some years before, and which had not been eradicated from her system. No doubt there were many cases like this. A case in his own practice was caused by the imperfect removal of the pulp of a superior molar. It is generally believed that sick-headache is neuralgic. Exodontosis is sometimes the cause of severe neuralgic pains.

A. P. Merrill, D.D.S., looked to the teeth for the cause of facial neuralgia when the general health is good. Has afforded relief by administering chloroform internally, and has employed the electro-magnetic current in other cases with equally happy results.

G. A. Mills believed that ninety-nine per cent. of the cases that present are due to local causes. Described a case in which the cause was due to the teeth, and in which a cure was effected by making the diseased teeth well instead of removing them. In some cases he had successfully exhibited belladonna, aconite, and mercurius vivus.

A. L. Northrop, D.D.S., spoke of a gentleman who had "suffered many things of many physicians and grew nothing better, but rather worse," whom he relieved by excising one of the branches of the dental nerve and dressing with iodine and creasote. The dressings were continued for a week, and then the patient was discharged.

J. C. Robbins had believed, and still held, that the cause is nearly always local. He cited cases to verify his conclusions.

R. W. Varney, M.D., objected to the term ulceration as applied to the peridental membrane; ulcers are superficial, abscesses are deep seated.

LIVERPOOL CHEMISTS' ASSOCIATION.

A MEETING of the members and friends of the above Association was held at the Royal Institution, on Thursday evening, November 21st, to hear a Lecture by Dr. W. H. Waite, dentist, on "Nitrous Oxide, a Substitute for Chloroform." The lecturer commenced by observing that pain, though commonly regarded as an evil, was in reality one of the greatest blessings a merciful Providence had bestowed upon us; but for its imperative intimations, diseases of various kinds might hold high carnival over us unchecked by the timely interference of remedial agencies. The pain consequent upon the employment of these remedies was, however, in many instances, most severe. And it was unquestionably the bounden duty of all whose calling led them to the necessity of inflicting pain to see that every possible method of alleviation was adopted. The discovery of anæsthesia was a priceless boon to suffering humanity and to those who profess any branch of the healing art. For this discovery we were indebted to Dr. Horace Wells, a dentist of Hartford, Connecticut, United States, and it was somewhat remarkable that the agent by which he made the discovery was nitrous oxide or laughing gas. Owing to difficulties which Dr. Wells could not surmount, this gas was however discarded; and two years after Dr. Wells discovered ether. Twelve months after this again, chloroform was applied to this purpose by Dr. Simpson, of Edinburgh. The latter two agents are in constant use, but during the past two years there has been a very extensive return to the use of nitrous oxide all over the United States. This gas is closely allied to atmospheric air, and is therefore free from the poisonous elements which both chloroform and ether contain. When inspired perfectly pure, its effect is to induce a delightful and refreshing sleep, with insensibility to pain; the recovery is almost instantaneous on the removal of the gas, and the patient experiences none of the unpleasant after-effect almost inseparable from chloroform or ether. The effect of breathing nitrous oxide appears to be gentle stimulation, unaccompanied by any undue excitement or risk if carefully prepared and administered; and the results of present experience seem to indicate that it is the most agreeable, the most speedy, and the least dangerous of all the known means of producing anæsthesia. The lecture was illustrated by experiments showing the various properties of nitrous oxide, and at the close

its anæsthetic power was exhibited in a very successful manner, though the period after the inhaler had been removed from the mouth and consciousness returned was but short. A vote of thanks was accorded to the lecturer.—(*English Paper.*)

SUSQUEHANNA DENTAL ASSOCIATION.

WILLIAMSPORT, PA., Jan. 17, 1868.

To the Dental Profession:

AT a regular semi-annual meeting of the Susquehanna Dental Association, held at Milton, Pa., January 15th, 1868, the following resolution with reference to the course pursued by the Dental Vulcanite Co., toward the Dental profession, was unanimously adopted, and the co-operation of the profession throughout the country solicited, to the end that no further annoyance may arise from that source:

Resolved, That the members of this association consider the action of the so-called Goodyear Dental Vulcanite Company irregular, unjust, and an absolute imposition; and that, as a body, we will discard and discourage the use of hard rubber for dental purposes, and adopt such substitutes as we may severally prefer.

By order of the association.

M. D. L. DODSON, *Secretary.*

AMERICAN ACADEMY OF DENTAL SCIENCE.

A SOCIETY with this name has been recently organized in Boston by the adoption of a constitution and by-laws.

The officers for the session of 1867–68 are as follows:

E. T. Wilson, M.D., President; D. M. Parker, M.D., Vice-President; E. N. Harris, D.D.S., Rec'g and Cor'g Sec'y; J. L. Williams, M.D., Treasurer; John Clough, M.D., Librarian.

Board of Censors—E. G. Tucker, M.D., D. M. Parker, M.D., J. L. Williams, M.D.

EDITORIAL.

CORRECTION.

A COMMUNICATION (too long for publication) has been received from Mr. J. Q. Colton, correcting an inadvertence into which we were led in speaking, in the October number of the DENTAL COSMOS, of a private letter received from Prof. Kingsbury, and his presence at the rooms of

Dr. Evans when some demonstrations were made of the anæsthetic effects of nitrous oxide gas. Mr. Colton says:

"A little more than six months ago, I came to Europe for the purpose in part of demonstrating and introducing the use of nitrous oxide, and since then have been engaged with Dr. Evans in that business. At the time referred to, Dr. Evans had invited several distinguished physicians and surgeons, and among the rest Dr. Kingsbury, to attend at his office to witness the operations of the gas in extracting teeth."

Mr. Colton thinks he may be excused for feeling somewhat sensitive on account of his name being ignored in this connection. He may rest assured there was no intention of doing him any injustice, and that the paragraph referred to was intended merely as a kindly reference to an absent colaborer, and a recognition of the courtesy of Dr. Evans.

J. H. McQ.

PHILADELPHIA COLLEGE OF PHARMACY.

The following extracts from a circular are published with much pleasure, trusting that it may aid in securing the end desired:

"The Philadelphia College of Pharmacy appeals to those engaged in the drug business, and to all interested in the professions of pharmacy and medicine, for aid in the erection of a new college building. Incorporated in the year 1822, the college has steadily pursued a course of usefulness to the present time; from small beginnings, its school has grown in reputation till it now draws students from remote sections of our country, who, with those of our own city and vicinity, form a class too numerous to find adequate accommodations in the present building. This fact, involving the necessity of a new location, has claimed the attention of the board of trustees for more than a year past, and, on the 10th of December last, a special meeting of the college authorized the purchase on ground rent of a lot on the eastern side of 10th Street, between Cherry and Race Streets.

"A leading design is the location in the new building of a practical laboratory, for experiment and instruction. The alumni of the college have already subscribed several thousand dollars, part of which has been collected and invested at interest, for the establishment of such a laboratory, but it was appropriately postponed till more suitable apartments could be procured. The great utility of this proposed feature of our college can hardly be over-estimated; in the midst of this great city, we need a practical school, conducted on a sufficiently comprehensive scale, where those branches of chemical science pertaining more especially to medicine and pharmacy can find ample development, where adulterations and sophistications can be detected and exposed, and where all can resort, on the payment of suitably regulated fees, to solve the problems continually arising in the course of their manufacturing pursuits.

"With the design of obtaining the necessary funds for erecting and

furnishing the new building, a sub-committee will call on those in Philadelphia to whom this circular is sent; and those not called upon, who may desire to contribute, will please forward their names to either of the undersigned.

A. B. TAYLOR,	CHARLES ELLIS,	EDWARD PARRISH,
DR. ROBERT BRIDGES,	JOHN C. ALLEN,	WM. PROCTER, JR.,
WM. J. JENKS,	CHARLES BULLOCK,	WM. C. BAKES,
T. MORRIS PEROT,	JOHN M. MAISCH,	AMBROSE SMITH,
CHARLES SHIVERS,	JAMES T. SHINN.	

DILLWYNN PARRISH, *Chairman.*

T. S. WEIGAND, *Secretary.*"

This movement is deserving of success, for no institution in the country has exercised a better influence in the advancement of education and science.

J. H. McQ.

BIBLIOGRAPHICAL.

TEACHING FROM THE CHAIR AND AT THE BEDSIDE. *An Introductory Lecture delivered before the Medical Class, at Harvard University.* By OLIVER WENDELL HOLMES, Parkman Professor of Anatomy and Physiology. Printed at the request of the Class. Boston, 1867.

A copy of this address has been received from the author. The views advanced are decidedly iconoclastic in their character, and presented in that independent manner which on more occasions than one has excited the ire of narrow-minded formalists, who, too blind to profit by the sensible advice offered them, have vented their spleen on the author in the most envenomed criticisms. A most amusing and no doubt profitable advantage was recently taken of this by his publishers, who, in offering his latest work, "The Guardian Angel," for sale, presented in the advertisements not only the favorable notices of liberal critics, but in addition the most denunciatory comments of shallow-pated bigots.

The primary object of the discourse under consideration is to prove that the proposition to lengthen and multiply the winter course of lectures in medical colleges is open to objections, not only from the fact that there is already more material presented than the minds of students can profitably master, but that in addition it will interfere with the summer course of lectures and the highly *important* and *practical* instruction derived from private preceptorship. The following extracts are presented in illustration of his views, and every liberal and experienced instructor will recognize their force and admit that no greater folly can be indulged in on the part of a teacher than to attempt an exhaustive presentation of any department of science to raw students, whose minds are only able to grasp the elements or principles. The

object of collegiate instruction indeed should be rather to *teach* the student *how* to *learn* systematically than to endeavor to make him acquainted with a mass of facts which it has cost his preceptors from a quarter to half a century to acquire, and which the student can only acquire by prolonged and diligent application.

"The most essential part of a student's instruction is obtained, as I believe, not in the lecture-room, but at the bedside. Nothing seen there is lost; the rhythms of disease are learned by frequent repetition; its unforeseen occurrences stamp themselves indelibly in the memory. Before the student is aware of what he has acquired, he has learned the aspects and course and probable issue of the diseases he has seen with his teacher, and the proper mode of dealing with them, so far as his master knows it. On the other hand, our *ex cathedra* prelections have a strong tendency to run into details which, however interesting they may be to ourselves and a few of our more curious listeners, have nothing in them which will ever be of use to the student as a practitioner. It is a perfectly fair question whether I and some other Amercan professors do not teach quite enough that is useless already. Is it not well to remind the student from time to time that a physician's business is to avert disease, to heal the sick, to prolong life and to diminish suffering? Is it not true that the young man of average ability will find it as much as he can do to fit himself for these simple duties? Is it not best to begin, at any rate, by making sure of such knowledge as he will require in his daily walk, by no means discouraging him from any study for which his genius fits him when he once feels that he has become master of his chosen art?

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"I have written my lecture, not to undervalue any form of scientific labor in its place—an unworthy thought from which I hope I need not defend myself—but to discourage any undue inflation of the scholastic programme, which even now asks more of the student than the teacher is able to obtain from the great majority of those who present themselves for examination. I wish to take a hint in education from the Secretary of the Massachusetts Board of Agriculture, who regards the *cultivation of too much land* as a great defect in our New England farming.

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"The reason why we teach so much that is not practical and in itself useful, is because we find that the easiest way of teaching what *is* practical and useful. If we could in any way eliminate all that would help a man to deal successfully with disease, and teach it by itself so that it should be as tenaciously rooted in the memory, as easily summoned when wanted, as fertile in suggestion of related facts, as satisfactory to the peremptory demands of the intelligence as if taught in its scientific connections, I think it would be our duty so to teach the momentous truths of medicine, and to regard all useless additions as an intrusion on the time which should be otherwise occupied.

"But we cannot successfully eliminate and teach by itself that which is purely practical. The easiest and surest way of acquiring facts is to learn them in groups, in systems, and systematized knowledge is science.

You can very often carry two facts fastened together more easily than one by itself, as a housemaid can carry two pails of water with a hoop more easily than one without it.

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"Systematic or scientific study is invaluable as supplying a natural kind of mnemonics, if for nothing else. You cannot properly learn the facts you want from anatomy and chemistry in any way so easily as by taking them in their regular order, with other allied facts, only there must be common sense exercised in leaving out a great deal which belongs to each of the two branches as pure science. The dullest of teachers is the one who does not know what to omit.

"The larger aim of scientific training is to furnish you with principles to which you will be able to refer isolated facts, and so bring these within the range of recorded experience.

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"My advice to every teacher less experienced than myself would be, therefore; do not fret over the details you have to omit; you probably teach altogether too many as it is. Individuals may learn a thing with once hearing it, but the only way of teaching a whole class is by enormous repetition, representation, and illustration in all possible forms. Now and then you will have a young man on your benches like the late Waldo Burnett,—not very often, if you lecture half a century. You cannot pretend to lecture chiefly for men like that,—a Mississippi raft might as well take an ocean steamer in tow. To meet his wants you would have to leave the rest of your class behind, and that you must not do. President Allen, of Jefferson College, says that his instruction has been successful in proportion as it has been elementary. It may be a humiliating statement, but it is one which I have found true in my own experience.

"To the student I would say, that however plain and simple may be our teaching, he must expect to forget much which he follows intelligently in the lecture-room. But it is not the same, as if he had never learned it. A man must *get* a thing before he can *forget* it. There is a great world of ideas we cannot voluntarily recall—they are outside the limits of the will. But they sway our conscious thought as the unseen planets influence the movements of those within the sphere of vision. No man knows how much he knows—how many ideas he has—any more than he knows how many blood globules roll in his veins. Sometimes accident brings back here and there one, but the mind is full of irrevocable remembrances and unthinkable thoughts, which take a part in all its judgments as indestructible forces. Some of you must feel your scientific deficiencies painfully after your best efforts. But every one can acquire what is most essential. A man of very moderate ability may be a good physician, if he devotes himself faithfully to the work. More than this, a positively dull man, in the ordinary acceptation of the term, sometimes makes a safer practitioner than one who has, we will say, five per cent. more brains than his average neighbor, but who thinks it is fifty per cent. Skulls belonging to this last variety of the human race are more common, I may remark, than specimens like the Neanderthal cranium, a cast of which you will find on the table in the Museum.

"Whether the average talent be high or low, the colleges of the land

must make the best commodity they can out of such material as the country and the cities furnish them. The community must have doctors as it must have bread. It uses up its doctors just as it wears out its shoes, and requires new ones. All the bread need not be French rolls, all the shoes need not be patent leather ones; but the bread must be something that can be eaten, and the shoes must be something that can be worn. Life must somehow find food for the two forces that rub everything to pieces, or burn it to ashes—friction and oxygen. Doctors are oxydable products, and the schools must keep furnishing new ones as the old ones turn into oxyds; some of first-rate quality that burn with a great light—some of a lower grade of brilliancy, some honestly, unmistakably, by the grace of God, of moderate gifts, or in simpler phrase, dull."

In the concluding part of the address, a brief biographical sketch of the late Dr. James Jackson, Professor of the Theory and Practice of Medicine in Harvard University, is presented, and of whom the author says:

"No accident ever carries a man to eminence such as his in the medical profession. He who looks for it must want it earnestly and work for it vigorously, nature must have qualified him in many ways, and education must have equipped him with various knowledge, or his reputation will evaporate before it reaches the noonday blaze of fame."

OBITUARY.

At a regular meeting of the Albany and Rensselaer County Dental Association, held at Troy, New York, December 10th, 1867, the following preamble and resolutions were unanimously adopted:

Whereas, It has pleased the Almighty Ruler, in his wise providence, to remove by death from our midst Dr. D. F. Benne and Dr. Robert Nelson, both of Albany; therefore be it

Resolved, That in the death of Drs. Benne and Nelson this Society has lost two valued members, much beloved and highly appreciated by us for their great skill and zeal in the interest of the profession.

Resolved, That the citizens of Albany and vicinity have sustained a severe loss in the death of these gentlemen.

Resolved, That to their immediate friends this Society tenders its respectful and cordial sympathy, and that these resolutions be published in the Albany and Troy daily papers and the dental journals, and a copy, signed by the President and Secretary, be presented to the families of the deceased.

Dr. H. H. Young,
Dr. J. C. Austin,
Dr. W. F. Winne,
Committee on Resolutions.

Dr. W. F. Winne, *Secretary*. Dr. S. D. French, *President*.

PERISCOPE OF MEDICAL AND GENERAL SCIENCE IN THEIR RELATIONS TO DENTISTRY.

BY GEO. J. ZIEGLER, M.D.

"*On the Local Independency of Nervous Function.* By BENJAMIN W. RICHARDSON, M.D., F.R.S., Senior Physician to the Royal Infirmary for Diseases of the Chest.—In the course of these experiments on the temporary local destruction of nervous functions, no fact is more striking than the perfection of the isolation of the nerve-centres. Perhaps this mode of speech hardly expresses what I would convey, but I do not know better how to explain myself. The simple truth is, that the brain structure is one of the most indifferent conductors of caloric with which we can become acquainted. It can receive the force and hold it, but it conveys it badly. This is a provision of nature as beneficent as it is beautiful, for if the force of the nervous system could pass readily and immediately from one part to an adjoining part by conduction, individuality of function would be impossible. There would be but one organ, not, as there is, a series of organs linked together in structure, but isolated in regard to speciality of function. So, again, if by direct conduction one nervous centre could take up the force of the adjoining centre, it would constantly happen that the whole force of the system would be carried away at a single point, and a man might quickly be killed by having one hand or foot exposed to intense cold. The indifference of conduction practically prevents these occurrences, and secures individuality of action with continuity of structure so excellently that we can fully destroy, by the direct and limited action of extreme cold, the function of a single centre, without involving any other. Dr. Sedgwick, in one experiment, even succeeded in freezing the superficies of the left cerebral hemisphere of an animal, without in any way affecting the superficies of the right hemisphere; and this experiment can be extended to every segment of the nervous tract. When thus we pick out a part, and paralyze it for a time, we destroy specifically the function of that part, and we discover what is lost in function by such destruction. Peculiarly we discover the unity of function pertaining to the part. It appears to us as though the brain were not made up of portions of the same matter all united into one organism, but as though it were distinctly mapped out into insular divisions, each well separated from its neighbor, and having its own duties. It is like a continent divided into so many nations, all united by soil and air and other bases of existence, but yet each exercising a special function in regard to the continent at large, each having its own language, its own genius, its own laws.

"What determines this localization of power I cannot say with certainty, for as yet there has been seen nothing in the minute structure of brain matter to indicate a physical separation of parts. It is true we see difference in the gray and the white structure, and we assign with good reason the volitional force to the gray, the motional force to the white; but this is not a sufficient definition, because these parts themselves have special centres, with special functions assigned to each centre. The only mode by which I can see a separation is by the vascular supply of the nervous system, and by the bad conducting power of nerve mat-

ter. As each centre is supplied with its own vessels, through which alone it derives its force, and as each centre possesses the power of retaining force, there is set up an independence of organism in every part sufficiently perfect, I think, to secure isolation of function with unity of construction. The subject is one on which we can all think, and if we do not understand the reason of it, we at all events have the fact that each nerve centre is practically an independent centre of force.

"In describing this local independency of nervous function, I refer of course specially to physical facts, not to those metaphysical, or I had better have said psychological, arguments which the illustrious Gall instituted in regard to the isolation and development of the organs of the mind. In experiments on the inferior animals with extreme cold, it is only possible to observe the destruction of those functions which come under the direct observation of the senses—symptoms which are motor in character, and which cannot be traced back to any voluntary—that is to say, any purely volitional act of the subject. We must, therefore, rest content with the physical demonstrations we have seen, and leave the metaphysical as they were. At the same time, it would be unjust not to allude to the circumstance that, by the process of analogical reasoning, the argument of Gall is very powerfully strengthened. If each portion of the nervous system which governs motion is an independent local centre of power, it is a fair inference that each portion of the nervous system governing the mental acts is also an independent centre of power, for it is not probable there would be two methods for the reception of force in one series of organic structure—a structure which, whether presenting itself as gray or as white matter, possesses the same physical characteristic in respect to conduction of force.

"I append the above observation without any suggestion of adhesion to the theories of Gall in detail or to his classification of the position of particular organs in the cerebrum. His classification may be right or wrong; his grand generalization, from analogy purely physical, is certainly possible, and is most probable.

"ON THE BALANCE OF NERVOUS ACTION.

"Intimately connected with the fact of the independency of the nervous centres is another fact—I mean the balance of power which exists between certain nervous centres. We are accustomed readily enough to appreciate the balance of *muscular* power; we know how one muscle, or one system of muscles, balances, or, as it is commonly said, antagonizes the muscle or the system of muscles which may be in opposition. We have not, however, been able to recognize until now, because we had not previously had the means in our hands to ask the question of Nature, that this same balance of function also holds good in regard to certain parts at least, and perhaps to all parts, of the nervous system. But our present experiments present this truth in the most conclusive manner; it may be well to recall two of these experiments in illustration.

"You will remember that when we freeze the cerebellum we obtain backward movements of the body; when we freeze the corpora striata, we get forward or propulsive movements; when we freeze both, we get a negative condition—a paralysis. Thus we are led by the logic of experimental fact to the conclusion that these two nervous organs or centres balance each other in function, as in my arm the biceps and the

triceps muscles balance each other in function. When by my volitional power I will to walk forward, it is my cerebellum which regulates the power and governs the movement, while the corpora striata remain in abeyance. When I will to walk backward it is the corpora striata which regulate and direct the act, while the cerebellum remains in abeyance.

"The effects of this balance are singularly remarkable; they are seen in operation in nearly every act of life. When we go to sleep after long mental watching, the active retina, the active motor nerves that keep open the eyelids, the active portions of the anterior parts of the cerebrum with which these nerves communicate, exhaust first. Hence, under this condition the universal experience is towards an inclination to bend forward, and hence those nodding-forward movements which indicate the transitional stage from partial or anterior sleep of the brain to sleep of the whole structure, cerebral and cerebellar alike. When, again, we go to sleep after severe propulsive exercise, as after long walking, the cerebellum exhausts equally with the cerebrum, we feel desire to rest the whole organism, and we pass into temporary oblivion at once without any transitional stage at all. And this indeed is the normal state of sleep, that the brain shall be exhausted equally, and this indeed is the normal state of waking, that the brain shall be recharged with new force, during sleep, equally in all its parts.

"Apart from the phenomena of sleep, there are other phenomena which are commonly observed in daily life, and which are readily explained when the balance of the nervous power, as located in particular centres, is taken into proper consideration. Impulse, sudden, vehement, propulsive, under the influence of any impression which for a moment overpowers or paralyzes the cerebrum, is thus explained. Whenever the cerebrum is overcome by sudden shock, it fails in power the same as when its structure is deprived of force by the direct action of cold; then the propulsive cerebellum less affected shows its force unchecked, and there is forward propulsion. In the heat of battle it is not cerebrum, but cerebellum, which propels the man on; in the chase, in the race, it is the same; and my friend Mr. Alfred Haviland, taking up this same line of thought from these our experiments, has, I think very happily, suggested that that form of propulsive vehemence which nearly all persons feel when they look over a deep precipice or battlement is accounted for in a similar manner. The cerebrum, overcome by the impression made upon it, is for the moment deprived of power. The corpora striata sharing in the catastrophe, the balance between them and the cerebellum is destroyed on their own side, and the cerebellum, acting with sudden uncontrolled force, gives the initiative propulsive start, which is felt as the expression of an unreasoning and morbid desire to rush forward regardless of the result.

"I have confined myself thus far to an illustration of the balance of one set of nervous centres or organs—the balance between the corpora striata and the cerebellum. There are, however, many other similiar illustrations yet to be worked out. For example, there seems to me some point in the spinal cord for balancing that part of the medulla oblongata which governs the act of inspiration. If an animal be destroyed by injury to the medulla, the death invariably occurs from interference with the respiration; the heart will continue to beat, but the animal will cease to breathe. This is the broad fact, but when the phenomena

are more closely examined, we find that the breathing has ceased because the function of *in*spiration has ceased—*i e* the muscles of inspiration have been deprived of the force which gave them activity. The chest is left with the expiratory muscles in unopposed command, the lungs are found collapsed and more or less bloodless, and the right side of the heart is engorged with blood which cannot make its way. These facts tell us there is another nervous centre which governs the act of expiration—a point, I think, in the spinal column about the level of the first dorsal vertebra. In a future lecture I shall be able to speak with more precision on this subject. Meanwhile, I would direct the attention of observers generally to the great importance of making every effort to define these centres of balance with the strictest care. In the postmortem room a great number of facts may be gathered of course; but there are other fields of research wide open. Thus, if any of you are about to spend the vacation in the way of sport with the gun or rifle, you may, I think, contribute largely to science by carefully noting the mode in which an animal that has been shot falls, and by making examination afterward for the part of the nervous system in which it has been wounded. Some shot birds fall backward, turning rapid backward summersaults; others vault forward, and then drop suddenly; others, again, exhibit a series of lateral movements in coming to the earth. In every such case, then, when the character of the descent is well marked, it would be of great moment to examine the part of the brain or nervous system that has received the injury, and, as the anatomy of these parts is well defined, there can be no real difficulty in the path of the inquirer.

"DISTURBANCE OF NERVOUS BALANCE IN DISEASE.

"Indications of loss of balance between the centres of nervous force are constantly before us in disease. In fact, in a very strict sense, every active and sudden phenomenon of disease which we recognize is the result of this disturbance. Hence the reason why mental impressions influence so easily morbid changes of function for good or for evil. Cases of drunkenness from alcohol afford in various stages varying phenomena, all of which depend on varying degrees of disturbance in the function of the centres of force. As a rule, alcohol first influences those centres which govern the voluntary muscles; in time, the poison being continued, the centres of thought or sensation become influenced, and sensibility begins to fail; last of all, the centres of involuntary motion come under the spell. Again, during recovery from the intoxication, those centres which were first affected continue affected longest, the centres of thought and reason and sensibility becoming once more active while yet the centres of motion are in abeyance, and fail to obey the volition. Indeed, in the process of intoxication, where all the nervous centres are bathed in poison, so strikingly is the disturbance of balance manifested, that we can, for a time, gauge and measure a man by his acts and words. Those centres of his nervous organism which are most feeble succumbing first, the more active are left uncontrolled, and proclaim their preponderating power. The sentimentalist weeps, the ruffian shows fight, the man of memory grows yarny, the wit outdoes himself, the funny man laughs, the singer sings, the angry man grows furious, and the cunning rat gives you a rat's face that Landseer might study. Each man, in short, works his one big centre until it at last either succumbs with the rest, or the rest sober up to it. *In vino veritas*—Ah, truly! and trans-

lated physiologically it means that the strongest nervous centre is going full swing when all its balancing centres are under the table. The wine-glass itself is not more transparent than the man who has emptied it too often at one poisoning.

"Some forms of insanity partake in like manner of simple disturbance of balance. This is specially the fact in monomania, which may either depend on exalted function of one centre, or depressed function of those centres which should balance the one.

"In cases of pressure on the brain or spinal cord we get also signal instances of disturbed balance of nervous centre power. As when we froze the whole of the cerebrum of the pigeon we laid it unconscious, destroying its volitional power, and leaving its involuntary centres unaffected, so in some accidents causing general pressure (pressure is virtually the same in action as cold), the human subject has been laid low with the consciousness and volition lost, but the involuntary force unchanged. In other cases where we have a partial pressure we discern a more distinct irregularity of function, precisely as in the birds when the freezing is localized. I knew a case in which a man tried to hang himself, but was cut down before he was dead. As he was liberated, quite unconsciously, he rushed madly forward and fell; he lived three days, and after death I found extensive effusion in the ventricles and the most intense congestion of the cerebrum, the cerebellum being scarcely affected. That rush forward was from the action of the cerebellum—action uncontrolled. In one of my hospital journeyings a man was shown to me who, from disease, had lost portions of the bones of the cranium at the upper part, so that the cerebrum was covered only by skin, and the pulsations of its vessels could be felt. This man could bear slight pressure on the exposed part, but when the pressure was increased he at once became giddy, with an uncontrollable tendency to precipitate himself forward. I noted this at the time as a simple fact, thinking nothing then of the light that experiment would throw over these classes and forms of disease.

"We might linger long on these disturbances of nervous power as they are exhibited at the bedside, but I must confine myself on this occasion to one or two further notes, and these general.

"1. I would point out that in diagnosing the seat of injury or disease in cases of disturbed balance, the prominent or presenting symptoms should not be taken as of necessity indicating primary disease of the centre through which the symptoms are demonstrated, but sometimes of a centre, which may be remote—that is to say, a balancing centre. For example, involuntary convulsive movements, apparently spinal, and compatible with the hypothesis of increment of force in the cord, may, in fact, be due to mere decrement of controlling force in the cerebrum, as in convulsion from pressure on the cerebrum, from deficient cerebral organization, or from cerebral degeneration; or symptoms of deficient volitional power, apparently cerebral, and which are compatible with the hypothesis of decrement of force in the cerebrum, may be due to decrement of force in the spinal cord. Thus in my former lecture I explained that, on suddenly removing force from the cord by extreme cold, symptoms even of stupor were made manifest. In dealing with diseases of the nervous centres and in the careful diagnosis of these diseases, I know of no point of practice that is more important than this relation of balance between one centre and another, and the relative increment

of force in one centre by the loss of force in another centre that sustains the balance during periods of healthy action.

"2. If we forget this relative balance of power and destruction of balance by failure of one part, we may mistake often active symptoms arising from passivity of one organ and relative activity of another for actual increased activity of an organ that is quite natural. I believe this mistake is frequently made, and that it leads to bad results in practice—leads to the adoption of depressing treatment when the body should be most carefully sustained.

"3. In some extreme cases, where for long periods of time the nervous centres have been exposed to the continued action of a destroying agency—the agency of alcohol, for example—groups of centres of power, centres which balance each other, give way altogether, or so nearly together that disturbance of balance of function is seen but for a short interval, or is not seen at all. Cases of general paralysis and dementia, cases which so largely occupy our asylums for the insane, are of this class.

"Lastly, on this question of balance, I would point out what seems to me the fact, that the balance between two centres may suddenly be broken in moments of quick vehemency of action of one centre. The madness of rage, in which the cerebral reasoning centres become temporarily paralyzed by overaction, leaving the propulsive cerebellum to free and uncontrolled impulse, is a case of this kind in its temporary form and development. But the event may be more than temporary; the brief arrest of function, especially if it has been often repeated, will, in some instances, be attended with physical change of structure and loss of molecular capacity for the reception of force; and then, the balance of centre permanently broken, the phenomena which we call mental cease to be orderly; predominating impulses, or desires, or resolves, not, perchance, before known, because held previously in check, prevail; then the mind is unhinged, as the common saying expressively describes the pure physical truth, and then it is often ignorantly wondered how the sufferer, who once showed none of the tendencies he now shows, could have suppressed such tendencies so long or so artfully.

"I believe that the physical meaning of morbid impulse is, in every case, a broken balance of nervous centre; the sudden exhibition of uncontrolled force of an organ previously held in even action by another centre; a centre up to a given moment active, at a given moment dead.

"The nervous organism, in short, may die in parts, and one centre or more may be dead to the reception of force, while all the rest of the body, volitional and vegetative, lives, in mental constitution a changed body. In old age, this progressive change naturally envelops all the volitional centres which truly die, while the vegetative remain. And conversely, sometimes in the heyday of youth we see the mere vegetative centres die only, and thereupon—so dependent is the higher upon the lower life—all the centres of thought and volition share in the catastrophe; sudden and general silence and inertia communicating to the looker-on the phenomena which he summarises in the one word—*death*."—(*Med. Times and Gazette.*)

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"*Effect of Darkness and Silence.*—DR. KANE and other Arctic voyagers have all testified that, in those regions 'where eternal silence reigns supreme,' the effect upon the brain and ear from the absence of

sonorous impulses in the atmosphere is exceedingly annoying and absolutely injurious to the auditory nerves. As the organs of hearing are destroyed by loud and continued noise, and an intense light will weaken and ultimately destroy the power of sight, so it would appear that the auditory or optic nerves become impaired by the partial or total deprivation of their natural stimulus, sound or light. Dr. H. Ralls Smith, of Chicago, wishing experimentally to investigate this subject, recently spent a considerable length of time in the Kentucky Mammoth Cave, where silence and impenetrable darkness reigned supreme. The effect was very distressing, and almost insurmountable, resulting in temporary defection of hearing and aberration of mind. From his own experience this gentleman is firmly convinced that the blindness of the finny denizens of this cave has been brought about gradually through successive generations, and from his observations he is confident that the sense of hearing is also wanting in these beings, although originally existing in the species when first immersed in their living tomb."—(*Sci. Amer.*)

Anæsthesia from Electricity.—"The effects of a shock of artificial lightning on a gentleman of our acquaintance, who is very sensitive to the electric discharge, may be here described. Under ordinary circumstances, the discharge from a small Leyden jar is exceedingly unpleasant to him. Some time ago he happened to stand in the presence of a numerous audience with a battery of fifteen large Leyden jars charged beside him. Through some awkwardness on his part he touched a wire which he had no right to touch, and the discharge of the battery went through his body. Here life was absolutely blotted out for a very sensible interval without a trace of pain. In a second or two consciousness returned; the recipient of the shock saw himself in the presence of his audience and apparatus, and, by the help of these external facts, immediately concluded that he had received the battery discharge. His intellectual consciousness of his position was restored with exceeding rapidity, but not so his optical consciousness. To prevent the audience from being alarmed, he observed that it had often been his desire to receive accidentally such a shock, and that his wish had at length been fulfilled. But while making this remark the appearance which his body presented to him was that of a number of separate pieces. The arms, for example, were detached from the trunk, and seemed suspended in the air. In fact, memory and the power of reasoning appeared to be complete long before the optic nerve was restored to healthy action. But what we wish chiefly to dwell upon here is, the absolute painlessness of the shock; and there cannot be a doubt that to a person struck dead by lightning, the passage from life to death occurs without consciousness being in the least degree implicated. It is an abrupt stoppage of sensation, unaccompanied by a pang."—(*Harper's* and *Scientific American.*)

"*Neuralgia.*—Dr. Francis Pirotte gives numerous observations in which neuralgia was cured by the spray of chemically pure ether; the pains the most unyielding to all other means, ceased almost immediately. The ether is sprayed upon the painful part two or three minutes at a time, repeating it, if necessary, two, three, or four times, allowing sufficient time between each operation for the ether to completely evaporate. The temperature of the part at once falls several degrees

below zero, the skin becomes blanched, insensible, and soon the subjacent parts become equally in a state of anæsthesia, and relief follows. Sometimes, the pain flies from one spot to another, but must be followed up. No unpleasant sensation follows its use, unless the ether be impure, when annoying sensation of burning and irritation is produced. It may be employed for pains from whatever cause, itching, cholera cramps, local inflammations, tetanus, rheumatism, burns, etc. Its advantages are facility of execution, immediate disappearance of the pains, and prompt cure, and economy.

"In symptomatic neuralgia, it is advisable to aid the security and the rapidity of the treatment, by appropriate internal and external measures, as sulphate and valerianate of quinia, iron, tonic bitters, iodide of potassium, removing tumors, healing wounds or ulcers, etc."—(*L'Union Médicale de le Gironde* and *E. Med. Jour.*)

Inflammability of Ether.—In the proceedings of the Med. Journ. Association of New York (*Med. and Surg. Rep.*), it is stated that "Dr. Packard has proved by experiment, that the ether vapor will not take fire if the light is held above it, while if held below, it may take fire. In operations, then, by candle light, there is no danger if the lamp is well elevated, as the gravity of the ether vapor causes it to descend."

"*Bisulphid of Carbon.*—The inhalation of the vapors of this substance, to which some persons employed in the manufacture of caoutchouc or India-rubber (for which this liquid is a solvent), are exposed, causes in the first place great disturbances in the digestion, various in their nature according to the constitution of the individual; next serious derangement of the nervous system, dullness, loss of memory, and injury to the intellect; afterward more or less complete paralysis, and finally absolute genital impotence, the testicles become smaller, and the post-mortem of females showed an almost entire obliteration of the ovaries."—(P. H. Vander Weyde, M.D. *Med. and Surg. Reporter.*)

"*Cutaneous Absorption by the Hands.*—Dr. Dufay, of Blois, having turned a solution of acetic acid upon his fingers, experienced a taste of vinegar. This suggested to him a trial of the absorbent power of the hands in a case of neuralgia, where frictions of quinine in the axilla had been without result. For this purpose he had the skin of the hands softened by washing in warm water, and then turned into the palms a spoonful of water containing 15 grains of quinine. But two or three minutes of rubbing the hands together were required for the absorption of this quantity of liquid. One hour after, dizziness and ringing in the ears tormented the patient; but the neuralgia left, and did not return. Two more frictions confirmed the cure. Ten more cases have been treated in the same manner, and in no one has the effect of the quinine failed."*—(*L'Union Médicale* and *Boston Journ. of Chem.*)

Fracture of Jaw.—In a synopsis of five hundred fractures treated at the Boston City Hospital, in three years (*Boston Med. and Surg. Journ.*), Dr. D. W. Cheever states that "*Fracture of the superior*

* Septic and other poisons may also be thus absorbed to the temporary or permanent injury of health.—Z.

maxilla, recognized as very rare, existed *once* in five hundred other fractures. The malar process and the antrum were broken by great direct violence. Recovery was early, and without necrosis. Malgaigne makes a special exception, in the case of this bone, to the rule about removing comminuted fragments in compound fractures. All such particles usually become reunited, if suffered to do so. The great reparative power of the upper jaw is well shown in the case of its section and displacement for polypus, in the first paper of this series.

"Of the fourteen *fractures of the lower jaw*, several were double, and one triple. Only one was a simple fracture. They were usually compound into the mouth. Where double, one was near the symphysis and the other near the angle. These double fractures were very hard to keep in place. I am inclined to think that the second fracture is often overlooked. One of the double compound fractures was followed by abscess, an opening through the skin of the chin, and necrosis with non-union. In this case the bones were drilled and wired from the outside. The wires were removed in six weeks, and union was firm. There was less inconvenience and suffering than when internal wiring and splints were used."

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"*Injuries of the Face.*—Under this head are entered sixty-two cases, none of which were fatal. Two were complicated with erysipelas, and eleven with injury to some other part of the body. Eleven cases of *fracture of the lower jaw* were admitted. A four-tailed bandage, and occasionally a gutta-percha splint, comprised the local treatment. There were four cases of *fracture of the bones of the face*. One of these was a fracture of the upper jaw in a man who was jammed between the buffers of two railway trucks in motion. Eleven cases of *contusion* and thirty-one of *wounds* constitute the greater proportion of the injuries to the face."—(*Extract from St. George's Hospital Reports. Med. Press and Cir.*)

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"*Reunion of an Amputated Finger.* By WALTER BERNARD, L.K.Q C.P. —On the 16th of November, Michael Nellis (shirt collar-cutter, aged nineteen years), while removing 'a cut of collars' from a circular knife impelled by steam, had half an inch cut off the top of the middle finger of the left hand, including the pulp and portion of the nail. The line of separation ran in an oblique direction. I saw him in ten or twelve minutes after. He was depressed, pale, cold, and shivering. I inquired if the piece could be found. In a few minutes it was brought to me dirty, out of some rubbish. Having very gently removed all particles of dust and blood, I replaced the piece and adapted the cut surfaces, the portion of nail attached to the separated part being a guide to perfect coaptation. It has now (November 27th) united throughout, healing near the nail by granulations, the remainder by the first intention. I ascribe my success to the perfect coaptation of the surfaces, warmth, a good constitution, and securing the hand across the chest in order to prevent the finger from being jarred during sleep, and the parts disturbed. I adduce this as an additional case in proof of the prudence of making a trial to secure the reunion of separated parts."—(*The Medical Press and Circular.*)

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"*Osteosarcoma of Lower Jaw.*—Mr. Christopher Heath exhibited to the Pathological Society of London a large osteosarcoma of the lower jaw, which he had removed from a patient who unfortunately sank from exhaustion on the sixth day. He called attention to the fact that the tumor had sprung from the interior of the bone, and was of a benign character, and that the inner lamella of the jaw was perfectly smooth and entire, as was generally the case in tumors of the kind. The vessels of the neck were never involved in such cases, and it was only to be regretted that the patient had not been submitted to an operation at an earlier date. The tumor weighed 4 lbs. 6 oz., and was one of the largest of the kind. Mr. Heath showed drawings of the patient, and a wax model of the tumor."—(*Lancet.*)

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"*Ivory Tumor of the Upper Jaw.*—On the 30th ult. Sir Wm. Fergusson removed a very remarkable tumor of the upper jaw from a healthy young man aged twenty-one. The deformity produced by the growth was very considerable, the eye being dislocated to the outer side, but still retaining its power of vision. The tumor was of a dense osseous nature, the greater part of it being as hard as ivory. It was of twelve years' growth, and was of the size of the clinched fist. Thanks to the exertions of some adventurer, a portion of skin covering the tumor had been destroyed by caustic, in the vain hope of thus getting rid of the disorder. The operator experienced unusual difficulties in the progress of the operation, owing to the extent and density of the mass to be removed. He succeeded at length, however, in isolating the growth and excising it with very little loss of blood. We regret to hear that the patient died rather suddenly on Tuesday morning.

"Sir Wm. Fergusson's patient reminded us forcibly of a case recorded by Mr. Hilton in the first volume of the 'Guy's Hospital Reports,' which was that of a man aged thirty-six, who for twenty-three years had suffered from a large bony tumor of the left upper jaw, which eventually spontaneously separated, leaving an enormous chasm behind it, which is represented in a drawing accompanying the paper in question. In that case the ivory-like mass weighed 14¾ oz. The eyeball had been displaced and destroyed seventeen years before the tumor separated. In Sir Wm. Fergusson's case surgery interfered at an earlier date, and the patient, had he lived, would have retained the use of this important organ."—(*Ibid.*)

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Artificial Teeth Swallowed.—The *Med. and Surg. Reporter* states that "Dr. E. A. Kitzmiller, of Piqua, swallowed a vulcanite plate, containing two small teeth, recently. No injury resulted from the accident."

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Œsophagotomy for Extraction of Artificial Teeth.—In a letter to the *Med. and Surg. Reporter*, Dr. Maxson mentions (*Pacific Med. and Surg. Journ.*) "two successful cases of œsophagotomy in Guy's Hospital, for the extraction of plates with teeth. In one of the cases the plate, though large, could not be felt till the œsophagus was laid open."

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"*Risk from Operations.*—A very interesting lecture on this subject, delivered in St. Bartholomew's Hospital, by James Paget, F.R.S., is reported in the September number of the *Lancet.* The distinguished

surgeon regards boys from 12 to 16 years old, coming from the printing-offices, as exhibiting the most favorable condition for recovering from injuries and operations. The remarkable recuperative power of these boys, many of whom are brought into the hospital with crushed hands and arms, reduces the aggregate mortality from amputation of the upper extremity in the hospital. The danger increases as patients grow older, and is very imminent in old persons, who are apt to die speedily from shock, or in a few days from exhaustion. Scrofulous persons bear operations well, but the difficulty is in the healing. Syphilis is not unfavorable, nor is gout, or cancer. Overfat people are bad patients. Overfeeding is nearly as bad as drunkenness. Country patients are much better than town's people. 'Cold-blooded' persons, with cold and moist hands and feet, are bad subjects, and sensitive and nervous ones, are good subjects. The influence of strong drink is especially noxious. On this subject the lecturer remarks: 'One does, indeed, sometimes meet with habitual drunkards who pass safely through the perils of great operations; but these are rare exceptions to the rule, according to which one may reckon that the risks of all operations increase with the increasing degrees of habitual intemperance. I think you will find that a habit of slight intemperance is much worse than occasional great excesses; that regular soaking is worse than irregular carousing: probably because of the steady impairment of the blood and of all the textures to which the soaking leads. Of course you will keep your hands off notorious drunkards, unless you are driven by the stress of a strangulated hernia, or a stopped windpipe, or something leaving you as little choice as these do. But you must be on your guard to detect a good deal of drunkenness of the soaking kind which is not notorious and not confessed. Be rather afraid of operating on those, of whatever class, who think they need stimulants before they work; who cannot dine till after wine or bitters; who always have sherry on the sideboard; or are always sipping brandy and water; or are rather proud that, because they can eat so little, they must often take some wine. Many people who pass for highly respectable, and who mean no harm, are thus daily damaging their health, and making themselves unfit to bear any of the storms of life.'"—(*Pacific Med. and Surg. Journ.*)

Identity of Pus and White Blood Corpuscles.—"In a remarkable discourse, most eloquently delivered before the Berlin Medical Society, Dr. Cohnheim detailed the results of his observations on the formation of pus as a product of inflammatory action. These results are of sufficient significance to mark a new era in the history of pathological science.

"The generally accepted theory of Pyogenesis, which refers the origin of pus-corpuscles to the proliferation of cells or germinal matter in connective tissue, has received its death-blow.

"The morphological resemblance of pus-corpuscles to white blood-cells has long been universally acknowledged. The modern discovery of the contractile properties with which they are both endowed, has tended still further to strengthen the belief in their very intimate relationship. Dr. Cohnheim has now demonstrated their *identity* by proving that *pus-corpuscles are actually white cells which have emigrated from the blood-stream.*

"He commenced his studies in the cornea, the classical ground for

the study of inflammation. Availing himself of the well-known properties of white blood-cells to grasp and fix finely divided substances in their contractile stroma, he has been enabled to track these bodies, colored by aniline-blue injected into the blood, to the seat of inflammation, artificially excited in the cornea, and to recognize them as the cellular elements infiltrating the inflamed part. He has, moreover, succeeded, in a second series of observations, for which, for obvious reasons, a transparent vascularized tissue was selected, in actually observing step by step the emigration of the white corpuscles through the walls of the veins and capillaries of the inflamed mesentery into the surrounding tissues, and the pseudo-membranous fibrin effused on its surface.

"The connection between these extraordinary facts and the well-known observations of Recklinhausen (Virchow's *Archiv*, 1863, vol. xxviii. pp. 157–197), on the presence of wandering contractile corpuscles in the plasmatic channels of the cornea, mesentery, and connective-tissue of other parts, will at once be evident.

"Recklinghausen ventured upon no definite statement as to the origin of these bodies. He alluded to the probability of their being formed from the first connective-tissue corpuscles; but found it impossible to adduce any observation calculated to give support to this supposition. He had recognized their morphological identity with pus-cells, lymph, and white blood-corpuscles. He was acquainted with the increase and accumulation of these wandering elements, as 'the essential change in the slighter degrees of inflammation;' but the chain of observations necessary to assign to them their true position and origin had to be completed by Dr. Cohnheim's elaborate investigations.

"It is interesting to remark, for the purpose of illustrating the stages of continuity in scientific discovery, that Recklinhausen had also demonstrated the possibility of contractile cells penetrating the corneal tissue from without by a very ingenious experiment. He inserted pieces of cornea and finely powdered vermilion into the lymph-sacs of living frogs, and found them on removal after a certain time infiltrated with wandering lymph-corpuscles laden with granules of vermilion."—(*Brit. Med. Journ.* and *Med. News.*)

Carbolic Acid.—"It was discovered by Runge, in 1834, who gave it the name carbolic acid. It possesses remarkable powers as an antiseptic. Most of the disinfecting powders now in use are nothing more than a mixture of carbolic acid and plaster of Paris. It is the opinion of some that this acid is capable of absorbing offensive gases of putrefaction, but a number of experiments show plainly that it has no influence over gases, but it prevents putrefaction, and thus obviates the formation of gases.

"It has the power of arresting fermentation, produced by organized matter, and also prevents its further development. Its mode of action is not thoroughly understood, but it appears to act by attacking vitality in some mysterious way.

"The experiments of Mr. Crooks prove, conclusively, its action on vitality. 'Cheese mites were immersed in water, where they lived for several hours; a few drops of a solution of carbolic acid, containing one per cent. added to the water, killed them instantly. A few drops of the solution was added to water in which small fish were swimming; it proved fatal in a few minutes. Water containing infusoria was placed

under the microscope, and a small quantity of a weak solution of carbolic acid was added; it proved fatal, and arrested their movements at once. These animalcules are almost constant attendants of putrefactive fermentation.'

"Dr. Lemar and other observers state that the vapor of carbolic acid proves fatal to flies, ants, and their eggs, lice, bugs, ticks, centipedes, acaria, butterflies, earwigs, woodlice, cockchafers, and other insects of their size. When such animals are killed with carbolic acid, their bodies resist putrefaction for a long time. During the past year, a solution of carbolic acid has been used in many of the medical colleges for preserving anatomical material, for which it has proved a valuable agent.

"Dr. Crooks had occasion to employ a variety of disinfectants during the prevalence of cattle plague in England, and found none so efficient as carbolic acid.

"The vapor is by no means offensive to the higher classes of animals, and there is comparatively little danger in handling it. Should a portion of the acid, in an undiluted state, come in contact with the integument, it acts as a mild caustic, but if rubbed or washed off, no inconvenience is felt. As a therapeutic agent, it has been most extensively used as an external application.

"In sloughing wounds, a solution composed of one part acid to forty parts water produces the most marvelous effects: it destroys all fetor, facilitates the separation of the slough, and causes the parts beneath to assume a healthy appearance. It seems also to have the effect of promoting the growth of healthy granulations, and of hastening the healing process of wounds."—(WM. LITTLE, M.D. *Chicago Med. Jour.*)

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"*Carbolic or Phenic Acid and its Properties.* By DR. F. CRACE CALVERT, F R. S., etc.—The disinfecting or rather antiseptic properties of carbolic acid are very remarkable. The beautiful researches and discoveries of M. Pasteur have shown that all fermentation and putrefaction is due to the presence of microscopical vegetables or animals, which, during their vitality, decompose or change the organic substances, so as to produce the effects which we witness, and as carbolic acid exercises a most powerful destructive action upon these microscopic and primitive sources of life, carbolic acid therefore is an antiseptic and disinfectant much more active and much more rational than those generally in use.

"It is necessary that I should here make a few remarks, explanatory of the distinctions between *deodorizers*, *disinfectants*, and *antiseptics:*

"*Deodorizers.*—All substances merely acting as such are neither disinfectants nor antiseptics, as they simply remove the noxious gases emitted from organic matters while in a state of decay or putrefaction, without having the property of arresting decomposition or fermentation. For it has been proved that the source of infection or contagion is not due to noxious gases or bad smells (being merely indicators of its probable existence), but as we shall see presently, to microscopic spores floating in the atmosphere, and which by their ulterior development and propagation, are believed to be the true source of contagion.

"*Disinfectants.*—Under this head may be classed bleaching powder, or chloride of lime, sulphurous acid, and permanganate of potash; they first act as deodorizers, and then as disinfectants, but they must be employed in large quantities to thoroughly oxidize or act upon organic matters, so as to prevent them from again entering into decomposition,

but still it is known that if the organic substances so acted upon are exposed to the atmosphere, they will again experience decay and putrefaction; they are, in fact, more destructive agents than disinfectants, and they are never antiseptics.

"*Antiseptics.*—Antiseptics, such as corrosive sublimate, arsenious acids, essential oils, carbolic acid, etc., act as such by destroying all source of decay and decomposition, that is to say, they destroy or prevent the formation of the germs of putrefaction and fermentation, without acting upon the mineral or vegetable matters present. The advantage of their use is therefore that they act, when used in small quantities, upon the primary source of all organic matters in a state of decay; further, they are deodorizers, for they prevent the formation of offensive odors, and consequently they are antiseptics, disinfectants, and deodorizers. The great advantages which carbolic acid possesses over all other antiseptics are, that it cannot be used for any illegal purpose, as arsenic and corrosive sublimate.

"And allow me further to add that disinfectants, such as chlorine, permanganate of potash, or Condy's fluid, operate by oxidizing not only the gaseous products given off by putrefaction, but all organic matters with which they may come in contact; while carbolic acid, on the contrary, merely destroys the causes of putrefaction, without acting on the organic substances. The great difference which therefore distinguishes them is, that the former deals with the effects, the latter with the causes. Again, these small microscopic ferments are always in small quantities as compared to the substances on which they act, consequently a very small quantity of carbolic acid is necessary to prevent the decomposition of substances; therefore its employment is both efficacious and economical. Moreover, carbolic acid is volatile; it meets with and destroys, as Dr. Jules Lemaire says, the germs or sporules which float in the atmosphere, and vitiate it; but this cannot be the case with Condy's fluid, chloride of zinc or iron, which are not volatile, and which act only when in solution, and are mere deodorizers. This is why carbolic acid was used with such marked success, and therefore so largely in England, Belgium, and Holland during the prevalence of cholera and of the cattle plague."—(*Chem. News.*)

Torsion of Arteries to Suppress Hæmorrhage.—"In cases of bruise, fracture, dislocation, and even operations of tenotomy, large quantities of blood are frequently effused more or less deeply under the integuments without causing any bad effect, and quickly disappear by means of absorption. How, then, does it happen that blood collected in the cavity of a wound should be productive of so much mischief? It can only do so, as Mr. Lister has shown, through the decomposing influence of atmospheric air, loaded with its myriads of organic atoms, and, therefore, if protected from this agency, would be no more hurtful than in the circumstances just mentioned. He has accordingly found, as stated in the preceding numbers of this journal, that wounds of the most formidable character may be divested of all their alarming features by means of carbolic acid, applied so as to prevent the impure air from entering.

"This remarkable fact has led me to consider the expediency of resorting more frequently than heretofore to the use of 'torsion' for the suppression of hæmorrhage. Ever since this method was proposed by the late M. Amussat I have employed it in wounds of the cheek and lips, and also occasionally in more serious operations, to let my pupils

see that it was quite effectual, but have been prevented from adopting it for general use, by fearing that the absence of ligatures, which serve as conductors of the discharge, would increase the risk of blood or serum being pent up in the cavity. Feeling now happily relieved from any apprehension of evil being thus produced, I think 'torsion' may in many, if not in all cases, be employed with advantage, instead of the ligature. In order to perform the process effectually, it is necessary that the artery should be seized by catch-forceps, and twisted until they become loose. It has been alleged that such a liberty with the vessel must cause it to slough, and thus disturb the adhesive action. But as this objection is altogether theoretical and contradicted by experience, it is unworthy of notice.

In illustration of what has been said, the two following cases may be mentioned as sufficient to substantiate the facts:

1. That torsion effectually restrains the hæmorrhage of ordinary-sized arteries.

2 That its action upon them does not prevent union by the first intention.

3. That protection from the air prevents decomposition of the blood.

Case 1. On the 27th of May I amputated the middle finger of a young woman in the hospital at the metacarpal joint for disease of three years' standing, and arrested the bleeding by torsion of the arteries, which were three in number. A mixture of carbolic acid and linseed oil, in the proportion of one to five, having then been freely applied to the surface of the wound, I tied the adjoining fingers together so as to retain the cut edges in contact, and placed over them a piece of lint soaked in the carbolic mixture. The result at the end of three days was complete and perfect union without any discharge of matter.

Case 2. On the 11th of June Mr. Annandale removed a tumor from the chest of a male patient by an incision ten inches in length, and employed the torsion for five arteries, two of which were of considerable size. He then applied the carbolic mixture freely to the wound, brought its edges together by silver sutures, and covered them with lint soaked in the protective fluid. Three days afterward I saw the wound soundly healed without a drop of matter."—(PROF. JAMES SYME. *Lancet.*)

Preserving Anatomical Specimens.—In a letter to the *Chicago Med. Journ.*, Professor Freer writes: "I saw a preparation by the Phenique acid method, which was perfectly pliable, and plump as a recent dissection; even the small joints of the fingers were as flexible as in the most recent state, and at the same time, the specimen—which was a well-dissected arm—was as dry as leather, and without odor, other than from the acid, which is not at all disagreeable. This is something worth looking into—if the acid is not too expensive, the method is invaluable for medical colleges The process by tannic acid must be very tedious and expensive."

"*Water as a Gas Absorber.*—Set a pitcher of water in a room, and in a few hours it will have absorbed nearly all the respired and perspired gases in the room, the air of which will have become purer, but the water utterly filthy. The colder the water is, the greater the capacity to contain these gases. At ordinary temperatures, a pail of water will contain a pint of carbonic acid gas, and several pints of ammonia. The capacity is nearly double by reducing the water to the temperature of

ice. Hence, water kept in the room awhile, is always unfit for use. For the same reason the water from a pump should always be pumped out in the morning before any of it is used. Impure water is more injurious than impure air. This shows the economy and the convenience of a modern ice pitcher—a splendid invention, which, as it seems, is more than ornament and show—ay, it is really and absolutely a necessity. Let these hints be heeded by our health-loving and life-preserving readers."—(*Druggists' Circular.*)

"*Free Sulphuric Acid in Mollusks.*—In addition to the *Dolium galea*, MM. St. Lucca and Panceri inform the French Academy that they have discovered free sulphuric acid in the glands of *Tritonium corrugatum*, *T. cutaceum*, and *T. hirsutum*, *Cassis sulcosa*, *Cassidaria echinophora*, *Murex trunculus*, *M. brandaris*, *Aplysia cornatus*, and others (not named). They observe, 'Free sulphuric acid is thus found to be an element necessary to the organic functions of a numerous class of mollusks, living in stony localities, and carrying a shell formed almost exclusively of carbonate of lime, accompanied by traces of carbonate of magnesia. The strong acid is found in company with a weak acid—carbonic.'"—(*Intellectual Observer.*)

"*Spontaneous Ignition, or Combustion.*—I beg to remind Mr. Holmes that a great many porous substances, *e.g.* finely divided metals, so readily absorb oxygen from air as to become visibly incandescent in daylight; not only powdered wood charcoal, but that article in bulk, equally so animal charcoal, and pitcoal, are not unfrequently known to have got ignited, the cause being due to the rapid absorption of oxygen from the air aided by the bad conducting power for heat these substances are endowed with. To the same category belong the phenomena of the spontaneous ignition of hay, straw, flax, and saw-dust in large heaps, also, and this is a frequent cause of fires, the extreme danger of cotton or linen rags, tow, and even some kinds of paper saturated with oil and grease. A few years ago a remarkable instance of spontaneous ignition took place in ships anchored in the roads of Batavia. On board these vessels among the cargo was a quantity of Turkey-red dyed cotton which, as is well known, is obtained by the use of oil as mordant. It was clearly made out by careful experiments made by a scientific committee appointed to inquire into the cause of these fires, which were at first taken to be due to malice, that actually the spontaneous ignition of the Turkey-red dyed cotton was the true cause of the fire. The spontaneous ignition of charcoal has often been fatal to gunpowder works, while equally, the spontaneous ignition of animal charcoal has caused fires in sugar refineries."—(Dr. A. A. *Chemical News.*)

BIBLIOGRAPHICAL.

Plastics: A New Classification and a brief Exposition of Plastic Surgery. A Reprint from a Report in the Transactions of the Illinois State Medical Society for 1867. By David Prince, M.D. Philadelphia: Lindsay & Blakiston, 1868.

This is an instructive and valuable résumé of plastic surgery. As a practical guide to plastic operations on the mouth and face it is of special interest to the dentist. It is freely illustrated, clearly printed on good paper, and neatly bound.

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ORIGINAL COMMUNICATIONS.

ON THE FALLACY OF SUPPOSING TWO CHANGES OF COLOR IN THE BLOOD; AND OUR WANT OF APPREHENSION OF THE FACTS.

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THE time-honored designations of carbonic acid as being "given off" from, or "taken up" by, or as being produced in the red-blood globule, from resolution of its substance into its combining atoms of carbon, etc., by the action of the oxygen upon or in it, form a series of contradictory suppositions, one of another, which do not involve the slightest recognition of the facts. So also the attribution of the color of venous blood to the presence in its globules of carbonic acid, succeeding diminution of oxygen therein, *is entirely devoid of the character of fact.*

The manifold character of these contradictions, each one of which is totally unreal, and hence false if either one of the others be true, plainly shows that we are yet ignorant of the facts or truth. Yet, since all are "received," or at least pass unchallenged, without note of the contradictory character of each toward the others, we shall be justified in examining into them.

First: the globules "give off" carbonic acid; this implies,—which means involves the antecedent supposition—that, they either took up from some unnamed substance carbonic acid, in order to give it off, or that what is given off is the carbonic acid which has been made in them, by the destroying action of oxygen, for such is the nature of the "combustion" of anatomical substances which it is often supposed oxygen works in the body. In this is also included the supposition of the complete resolution of the globule by the oxygen into its other combining

atomic elements, and their separation, as well as that of its carbon, by the oxygen supposed to combine with the latter.

But this is saying, under the form of a supposition, that what is given off is the carbonic acid produced by loss of the form of the globule, and change of its substance into atoms without organic form.

Second: it is supposed that the globule takes up carbonic acid—a supposition contrary to the preceding one, in which the globules yield their substance and form to the oxygen to form carbonic acid. The second supposition *assumes* the carbonic acid. From what do they take it up? From the blood liquor? But the blood liquor contains the carbonic acid in solution, and in carbonates in solution. We know of no act which shows that it has the slightest affinity for, or ability to unite with the blood globule. If it did, the act must be immediately followed and superseded by giving off, for if they contained carbonic acid the blood globules would have combined with a substance which disqualifies them to take up *oxygen* in the lungs. For the two transactions, of necessity one taking place, namely, the discharge of carbonic acid, before the other, namely, the taking up of the oxygen, cannot possibly be done by the globules. To do this, as it does, the globule must have discharged its oxygen, and be in a *state* of freedom from it, much less free from carbonic acid in its substance, to take up a new quantity of oxygen.

Third: the supposition that it is produced in the globule. This contradicts both prior suppositions. If this were indeed the case, the globules would not, following this production, contain or carry the carbonic acid, since it is produced by their destruction. But in reality all these suppositions alike are superstitious errors.

To the supposed "taking up" of carbonic acid by the globule has been assigned the *color* of the venous blood. But this color is not a CHANGE in or of the hue of arterial blood, as the supposition mistakenly assumes. This assumption is that the carbonic acid of the blood or tissue, is somewhere taken up by the globule, and substitutes for the arterial hue a darker hue—that of the venous blood; and thus what constitutes the dark hue is the admission of the carbonic acid into the globule. But, in fact, nothing can be more erroneous than this fancy, that the carbonic acid of the blood liquor can darken the blood by entering the globule, or in any other way that it can come into intimate connection with the latter.

Seeing that the supposition is false, in order to present the appearance of truth it must assume that the supposed darkening by carbonic acid begins while the blood globule is still reddish. But was this reddish or scarlet hue due to the carbonic acid? and hence the darkening to venous due to the elimination *from* it of the carbonic acid? Neither, of course, since the first is due to the oxygen the globule contains, and the darkening, as assumed in the supposition, is due not at all to carbonic acid

going *from* the globules—its giving it off, but to its supposed uniting with it.

Does the carbonic acid then drive out the oxygen from the globule, or does it possess the power of *converting* that *oxygen* into itself? But there is no room left, by the well-known facts, for such insane notions as these.

The carbonic acid has not the slightest affinity for the corpuscles. They will not take it up. The blood liquor will *absorb* it. Nor *do* the globules take it up. It has no one of the physical properties or characteristics in virtue of which it can enter into combination with the globule. To enter into combination with that, to the turning out of the oxygen in union with the globule, for which the latter has a remarkable avidity, would require that the carbonic acid had a far greater affinity for it, even if this extent of affinity were possible in the case of any substance.

But, false as this supposition is, that the blood darkens, or is venous because the carbonic acid "takes the place" of the oxygen—though this supposition is repeated in many places of text-books, let us assume or suppose that instead of *not* taking its place, it really did take its place. What then? The carbonic acid itself is devoid of *color*. It is not a colored substance. It cannot then *confer*, *give*, or communicate color. Then carbonic acid in the globule does not *constitute* the dark color? Assuredly not. Then its supposed presence in the globule cannot *darken* it, cannot make it venous? Neither, of course, can its supposed departure from the globule, its supposed "giving off," make a *change* to dark in the arterial hue, since it does not communicate color.

But let us ask the reader what is the ultimate fact of the color of the globule? Obviously enough, so much of its substance distributed throughout its form—its hematin (or hemato-globulin)—constitutes its color. This color, then, is substance, the substance of the globule.

Let us repeat, then, does the carbonic acid communicate or give *this*? Does it constitute the color in the globule? We thought it was not the carbonic acid, but the hematin, which constituted this color. As the carbonic acid is not the substance of that color, nor of *any color*, it can never, obviously enough, *confer*, *give*, or *communicate* color, even if it were "taken up" by the globule, or embodied in it (which it is not).

But despite this convincing look at the subject, some reader may ask, does not the carbonic acid cause some change in this color of the globule? The answer to this question is what we have substantially already given. But we will continue. We say, then, to the reader's question, obviously not. For the color which is dark or venous of the globule, supposed to be due to carbonic acid, is all precisely that state of it in which the "change" does not exist. A change there is in the substance—a change of color, but this does not exist at all while the carbonic acid is *supposed* to be in the globule.

But to return from the false supposition we have been following, that of the carbonic acid entering the globule—it could not of itself cause any such change of color in the latter as is supposed. We have shown that the carbonic acid cannot *darken* the blood, because it belongs, or is suspended in, that portion of the blood, namely, the blood liquor, which does not give it its color; and next, because it cannot confer upon the blood globule its color in venous blood.

But then, are there not, the reader may be supposed to ask, two changes of color? the one effected by oxygen, the other by carbonic acid? On the preceding suppositions, there are and must be. Because it is the most direct and perfectly simple of all perceptions to see, that while *we think the carbonic acid to change* the color, it must change the scarlet or arterial hue by producing or substituting another color in its stead. While, on the other hand, the dark or venous must be changed in precisely a similar way by the oxygen to the scarlet. But in reality there is no such two changes at all, and no *two colors*. Do these scarlet and venous hues denote two colors? We thought the substance of the hematin *was the color*. If there are two changes of color, then each must be characterized by the advent of a color *identified* with the substance thought to effect the change, which obliterates its preceding color; the scarlet color must be a *substituted* color for the dark or venous, and the latter *coming* must be a substituted color for the former *going*. The supposition of two changes necessarily involves two colors—both regularly *produced* by the carbonic acid and oxygen, and each regularly, alternately, and *anew*, *obliterating* and extinguishing the other.

Such is the complete form of its characters brought out, of our present notion of the changes of color in blood.

But, in reality, there are neither *two* colors nor two changes. The arterial hue is in reality no *color* given by the oxygen to the globule, instead of the venous hue. The oxygen does not constitute the color, which is precisely what we said of the carbonic acid; neither of them *constitutes* the color in the case. In order to do that, they must be colored substances, or color conferring or making substances, with power to displace from its form the colored substance of the globule, and occupy it instead. And we mistake the case utterly if we suppose either of them can be a *color* to the blood. That color is exclusively the hemato-globulin or cruorine.

What the oxygen really does, in inducing the scarlet, is to make a *change* in *this* color. This scarlet is no new color, instead of another color involving extinction of the latter and substitution of the former. The oxygen has neither the constitution as a substance, nor the quality as a character, to do this in arterial blood, any more than the carbonic acid has to do it in the venous. What the oxygen does then is to *change* the coloring matter of the globule; is to change its proper color. The

scarlet hue is, in reality, only a change *in* and of that. In the utmost strictness the color is one and the same, and the scarlet hue is only a change in that. The *difference* is that of a change or affection of one thing, and not that between two. The hemato-globulin or cruorine is the *basis* of this change, because without it no change could take place *in it.*

But it is this *indistinction* of a change and another color, which is our error. We think *one* of the change in a color *and* a color. But one is a substance, and the other a passing affection or *change* in that substance.

The change occurs at the beginning of its duration, and terminates by a return to the unchanged state. In reality, there is one change of a color in the blood. We must not confound this change in it with the color itself, although the change has no oneness apart from the color. All the changes in the body are of a similar character, and he who also does not at least dimly see this, has not apprehended the first lesson in its study, and has not the smallest understanding of it.

There is one change of color, and of one color of substance, in the blood, during which it is arterial. This is due to the presence of oxygen in the form of the red globule. When the oxygen is discharged in its passage through the arterial and capillary channels this change ceases, and the dark hue is simply a return to its *unchanged* state. Neither the arterial nor venous hue of the red-globule substance is a *production* of color by the oxygen or the carbonic acid. They involve no displacement of a carbonaceous or other atom, even by so much as the breadth of an atom, of the substance of the globule. As it takes up in swift succession, many times successively, its oxygen from the air in the lungs, it must maintain its anatomical integrity during its performance of that function.

To the end that we may fully understand each other, let us ask the reader if he supposes this is not an exact statement of the reality? Let us further ask him, what he supposes is the color (of substance—hemato-globulin, for instance) in which the change occurs to the scarlet or arterial hue? Does he say it is the color which preceded this change, namely, the venous color, or, is it another color?

If he says the former, there is no difference between us. But let us suppose for him the latter. Then in that case, as the venous hue does exist, and in the supposition it is *not*, but another color *is*, the color of the hemato-globulin, then it is implied that the venous hue is either a change *in* that other supposed color, or is a *color of itself, and in its own substance*, which has extinguished or substituted itself for the supposed hue. Let us consider the latter case. In that case, as no color *preceded* the venous, to be extinguished or displaced by it, but the scarlet hue, and as this also, like the venous, is *not* on his supposition the

color of the hemato-globulin, but some other color *is* (on his supposition), what is the character of the latter? It does not appear. Will he return to the point of the circuit of the inquiry we just concluded, and think it must have shown itself, or at least maintained its integrity unseen, before the hue became scarlet? But the only color then existant was that of venous hue. It turns out, in fact, then, that his other color is only possible in imagination, unless he will suppose that the color imagined, other than what does appear in his supposition, is kept permanently extinguished or put out of sight, first by oxygen, next by the carbonic acid, again by the oxygen, and so alternately endlessly. But then he is no nearer finding his supposition out as a fact; there is the *substance* of the hemato-globulin. Its color endures while the substance does undestroyed. This latter substance is a *fact* in his supposition, precisely and altogether as it is in ours. For it is the color of it he is to produce according to his supposition. This, it is found he cannot do, except by abandoning his supposition and so pronouncing it false. But he will now suppose it is either the venous or arterial hue, and not another unseen color.

Shall we suppose for him the former? But in this his supposition disagrees with our theory, and supposes that the arterial hue is not a *change* in a color, but the color itself. Then is it true, as he affirms in this statement, that oxygen does not make a change in hue, but on the contrary oxygenated blood, that which leaves the lungs, is the hemato-globulin's color, and not a passing *change* in that color. But if this be not a change, is that which immediately ensues, namely, appearance of the venous hue, a change in the color, and not the color itself? What then constitutes the taking place of this change? Does the carbonic acid unarterialize the blood, by displacing the oxygen, making it dark? But carbonic acid has not the slightest power to do this. *These two never displace each other.* He who supposes they do, errs altogether. If they do not, we must look elsewhere for the supposed change. But to what other source can we look, than to the loss or discharge of the oxygen? Although the reader supposed that the access of oxygen did not constitute a change, but preferred to suppose arterial hue the *color* itself *in* which the change occurs, instead of the venous hue, he now finds himself pent up in following that supposition to one conclusion, without breathing room for any other, namely, that the change to the venous hue, since it is not due to carbonic acid, *is* due to the discharge of oxygen. But let us ask him how he can call *that* which ensues on the *loss* of oxygen a change, and pronounce, as he has in his supposition, that which ensues on the access of oxygen *no* change? But it is becoming evident that his supposition misrepresents the entire *nature* of the theorem. It is the exact reverse of the facts. For if we intermit or suppress the access of oxygen, the blood throughout the system

remains entirely venous. Does not this show the absurdity of his supposition that the passage into the arterial hue is not the change in question in the real color, but is the color itself? Moreover, the access of the oxygen, the arterial hue, is a positive and measurable incrementation of substance, not the body's substance, into the globule. Shall we not regard what is characterized by such an event as a real change, and as constituting precisely what we mean by the term?

But notwithstanding the total error of the reader's supposition, he has taken the only alternative in the case For since there is a change of color, one or more, either we must identify this change in the color of the blood with the passage to arterial, or the passage to venous. And whichever of these two, the facts show it is *not;* the other is that in which it does take place or consists. And it proves that whichever the state or color of the blood which follows when this *change* is remitted, is the color—the red globular substance, upon and in which the change supervenes, and to which it returns when the change has occurred. And this color to which it *returns* is that of venous blood.

But we must draw to a close. Before doing so, however, let us occupy one moment more.

There are several experimental observations, the true import of which does not appear in our current representations of them, which prove that the dark color of the blood globules—of their hematin—has nothing to do with the supposed taking up by them of carbonic acid. Of these we adduce only two at hand.

1st. If arterial blood be drawn, it soon assumes a dark-red color. It has been invariably supposed that this is due, in some way, to carbonic acid resulting from change of substance of the globule; but this incident does not only not accord with the theory that carbonic acid darkens the globular substance, which it is adduced to support, but it is an overwhelming proof of the exact contrary. For if carbonic acid cause the darkness, and it be given off, as also is supposed, from this blood, it must not darken, but lighten, and remain so, as venous blood does.

2d. If blood enter a stream or vessel of water, the globules will immediately darken or nearly blacken. Is this due to carbonic acid? The mere question is an affront to one's understanding. Their darkening is due to immediate and complete loss of oxygen; and to the degree in which they become darker than in venous blood it is due to molecular change in the globule, involving no carbonic acid. This is an exact similitude of the event which occurs, as noticed by Bernard, in the blood in the capillaries *involved* in active muscles, which becomes darker than the hue of ordinary venous blood. Nothing *seems* more reasonable, and nothing, therefore, is more deceptive, than the supposition that, *because* there is a greater proportion of carbonic acid than usual in venous blood, the darkest hue is due to more carbonic acid. But the truth is exactly

and demonstrably otherwise. The darker than ordinary venous hue is not due to carbonic acid, but it is due to an organic change, induced by muscular compression upon the red-globular contents of the capillaries. The organic color is purple-red; it may become darker than usual elsewhere in the blood, as in this case.

In the foregoing we have convincingly shown, by showing the true character of the facts, not so represented elsewhere—

1. That there is *one color* of the blood, which is that of its hemato-globulin—of its red globules.

2. That this color is that which appears in venous blood.

3. That the blood in which no change is at the moment existing, is blood of the organic hue of the hemato-globulin, and this is venous blood—or rather the red globules of venous blood.

4. That the dark hue of venous blood is not a changed state made by carbonic acid gas.

5. That the change in the venous hue of the red-blood globule, regularly ensuing, is a change in this one color.

6. That this *change*, though done instantaneously at the lungs, the scarlet hue which is the *effect*, has a certain period of duration, which is that while the oxygen continues *in* the globule.

7. That in this period the oxygen is slowly passing from the globule into the plasma.

8. And that the ensuing *venous hue* is the return to hemato-globulin color, or that which gives color to the globule, in which the change is to take place.

9. That the coloring matter, being that of the organic substance of the globule, as regularly *returns* to its own hue as it is changed, but that the carbonic acid of the blood has no effect on this return, it being solely due to the release of oxygen.

10. That the organic hue of the blood is that in which the substance which gives it color, namely, the hemato-globulin, is its color when the globule is *un*oxygenated.

There is but one color of the blood, and a change in it. This color, of the hemato-globulin of the globules, is that of venous blood. And what we call a change in the arterial hue, naturally enough is nothing but a passing back or return of the globules from the state of change to this one color.

What indeed can be a more straightforward and obvious fact, on a moment's consideration, than that there are no two changes in the blood? For indeed, if with the instant entrance of oxygen, and with its discharge, there is a *recurrence* of the antecedent, what possible element is there entering into the transaction proving but one change, not actually accounted for? And if there are no two changes of color, but only one, the supposition that carbonic acid makes a change has no

room in reality. We may indeed as well call the change from venous to arterial blood two changes, as to call that from arterial to venous two. How indeed could the supposed carbonic acid enter the globule to make the second supposed change, except by doing so when the blood is yet arterial and replete with oxygen. It could, if we continue to *suppose* such an event, only do so by displacing the oxygen, or else *converting* the oxygen into itself (carbonic acid).

But why, if the former supposition be accepted by those whose vagaries we follow to expose, should they dodge this event of *displacement?* If this ensue, then we are forced to attribute the recurrence to dark as due to the evacuation of the oxygen. Your supposition is not free from a final presentment of the fact. But, in reality, what power has carbonic acid to displace oxygen? The greatest of marvels is that the globule is able, under most favorable organic conditions, to take up the oxygen, let alone its being thrust out of it by carbonic acid.

But, says some reader, may there not be two changes of color? Doubtless, if changes of color were the purpose of respiration; but that purpose is the introduction of the oxygen. To change the color is no purpose of nature; that is the *incident,* not the end.

In reality, the contrary supposition, namely, the supposition that the carbonic acid made a change in the color of the globule, never would have appeared but for the old superstitious notion that carbonic acid is either produced in it, or taken up by it, or even is given out by it. This superstition has been further promoted by the idea that as the globule takes up oxygen in the lungs it does the reverse in the systemic capillaries. But this is childish folly. The converse of taking up oxygen is not to take up something, but to give it out again, which is precisely what the globule does.

But finally, the reader may say, notwithstanding these truths, really the venous hue is not a change, but the carbonic acid may enter the globule, and so on.

After what has been said, it seems trifling with the reader to dwell any further on this question. But let us ask the reader why he supposes the carbonic acid enters the globule if no change of color is made by *it?* What purpose is served by its entrance? Does the reader suppose that the carbonic acid must be carried by the globule somewhere, to be got rid of somewhere else from the system,—for instance, to the lungs? But all writers, however much they may contradict their representation of the fact, when they have forgotten it, by other statements, state that the carbonic acid goes to the lungs, especially in the plasma, and is there displaced from it.

The above supposition, therefore, cannot be true. This is sufficient of itself, be the *fact* properly represented, to show the reader's supposition to be no fact, and, moreover, to establish the truth excluding

the possibility of his supposition that the carbonic acid is carried by the globule.

Finally, all the contradictions pertaining to the learning of this subject disappear on the apprehension of the fact—which fully explicates the arterialization of the blood and its return to its unarterialized color—that the latter is the color *to be* changed, and the former is the same color changed, or that the one is the color *when not* changed, and the other the color when changed. That the appropriation of the oxygen first, and its delivery afterward, constitutes at once the cause of this change, and regulates its duration. That the carbonic acid takes no part in the venous color, since that color is the proper color of the red globular substance. That the change occurs in this, but is over in its venous state.

What then is the exact defect in our present notion of two colors or changes? This defect is, that we do not yet recognize that the dark or venous hue is but a *return*, synonymous with loss of oxygen in the plasma, and not effected by the invasion of carbonic acid.

Bernard, in his estimation of *red* venous blood frequently passing through glands, has recognized the truth that the light hue is due to the continued presence in the globule, even into the venous system, of much the greater part of the arterializing oxygen. This truth literally *enters* into that we have presented, namely, that the dark hue is due to *loss* of oxygen; but he, like the rest of us, so far from recognizing that, if it be true as it is, that the continued presence of the oxygen prolongs the arterial hue even into the venous channels—the loss of the oxygen is the occasion of the cessation of arterial hue—has fallaciously proceeded, in accord with the prevailing fallacy of the venous color being due to carbonic acid, to affirm that in situations where this occurs, as in the salivary glands, the gland is pouring out from its duct, with its secretion, a larger amount than usual of carbonic acid. Thus specifically attributing the continuance of the arterial hue to the less quantity of carbonic acid in the blood there. But while the real fact is specifically one of longer duration of the presence of the oxygen in the arterialized blood, and itself has no complete identity without the further element that it is the loss of the oxygen which results in the venous hue, Bernard adduces loss or diminished quantity of carbonic acid as the cause of this retention of the oxygen beyond the usual point in the blood channels. But the loss of carbonic acid here has not the slightest pertinency to the continuance of the arterial hue into the venous system. Of course, in this estimation, Bernard follows the notion that carbonic acid darkens the blood.

The whole question here recurs. What is called Bernard's explanation is, however, nothing more nor less than a statement of the continuance of red color, and the theory we have been exposing. Let us again,

then, point out the error in this theory, and so have done with the subject once for all. Let us then ask the reader what constitutes the change in blood which makes it arterial or brightens it, that instant occurrence in the lungs? The entrance of the oxygen into the red globule. Now this change, which we have amply shown at all points is the one change in blood color, is not due to any change of relation or place of the carbonic acid—but is solely due to the entrance of the oxygen into the red substance, so that if the carbonic acid were eliminated by another route, or even was to continue to go over into arterial blood (as it regularly does, in large proportion, at times of digestion), this change constituting arterialization would still be effected. It is wholly dependent as an *act* upon something being taken in, and supposes as an absolute *condition* the freedom of the blood-color substance from any other substance. This transaction *for the globule* cannot involve any such instant contrariety of acts, as at once throwing off or "giving off" one substance and taking another. One is given off from the blood liquor exclusively, and the other taken in by the blood globules. The latter is the act of arterialization. Now what does this latter consist of? It consists of an *act* of taking in oxygen, *instantly accomplished.* This is marked by a scarlet hue. From this antecedent will follow the consequent, that this act *done* will be undone, *i.e.* the oxygen will be delivered to the plasma, and thence be distributed to the tissues by exudation. The becoming venous of the color substance is no act of the *carbonic acid.* Hence we err altogether, in attributing to it any power to undo this act of the oxygen. There is no known substance whose properties—those qualities which give it identity or distinguish it as a substance—are so obviously *adverse* to union with other substances. But if it were precisely the reverse of this, if it would unite or join any other compound, it would not, in the blood, occupy or modify the blood-color substance. For carbonic oxide itself, a gas thought to have the strongest possible affinity for the globules, if introduced into the blood, instead of occupying and becoming fixed in the globule as it does in drawn blood in the air, will leave the body precisely as carbonic acid does.

Now to hastily apply these facts to the case before us, so far as change of color is concerned, the period during which blood is red, from presence of oxygen, is very little variable. But the *space* over which it may travel in the blood channels in the period of its redness is very variable. Within that period, if flowing *rapidly*, it will pass into the veins and issue from them per saltum. It will be venous-red blood. This coming into the veins red, as marked by Bernard, is due exclusively neither to absence or presence of carbonic acid there, but to three physiological elements, admitted in part in all accounts of the transaction, though they err in implying that the want of the dark hue is due to absence of carbonic acid. These are (*a*) accelerated flow, and (*b*)

increase of volume of blood, and (*c*) extension of arterial pressure identified with both of these, into the veins.

The time from the taking up to the losing of oxygen is no greater than in the ordinary flow, but the part of the channels in which the latter occurs is greatly beyond what it is ordinarily. The increased secretive action in such vascular conditions is a direct consequence of the play of the elements in the transaction we have named.

CREASOTE.

BY ARTHUR MEAD EDWARDS, NEW YORK.

CREASOTE, discovered by Reichenbach in 1832, and named from two Greek words denominating "flesh-saver" is, when pure, "a colorless oily liquid of a high refractive power. Its taste is burning, and its odor extremely pungent and peculiar; if swallowed in doses of more than a few drops it acts as a poison." Its specific gravity at 20° is 1·037, according to its discoverer. "It does not solidify at —27°. Boils at 203, and distils in great part without alteration. When pure it does not become colored by exposure to the air. It does not conduct electricitv." It is combustible, burning with a sooty flame.

"Creasote is sparingly soluble in water, but mixes in all proportions with alcohol, ether, bisulphide of carbon, naphtha, and acetic ether. It dissolves sulphur, phosphorus, selenium, oxalic, citric, tartaric, benzoic, and stearic acids, resins and several coloring matters. With the aid of heat it dissolves several metallic salts, *e.g.* the chlorides of calcium and tin, the acetates of potassium, sodium, ammonium, zinc, etc., and deposits them in the crystalline state on cooling." It is also said to be freely soluble in benzole.

"Creasote partakes of the nature of an acid; it dissolves in caustic alkalies, and is decomposed by potassium, with elimination of hydrogen. Two potassium salts have been formed, also sodium, ammonium, barium, lead, ethyl, and benzoyl salts." It produces the immediate coagulation of albumen. "It is the most powerful antiseptic known. Meat that has been plunged into a solution containing 1 per cent. of creasote, gradually becomes dry and hard on exposure to the air, and acquires the flavor of smoked meat, but does not become putrid. A considerable proportion of creasote (from 1 to 1½ per cent.) is held in solution in the crude pyroligneous acid obtained during the destructive distillation of wood; and on saturating this acid at 75° with effloresced sodic sulphate, an oily matter which contains a large proportion of creasote is separated. Crude pyroligneous acid, on account of the creasote which it contains, is frequently employed for preserving hams and salted provisions, to which it communicates the same flavor as if they had been

exposed to wood-smoke." Pereira says that "it has very little action on caoutchouc, and does not possess any acid or alkaline reaction on test-paper. Mixed with water it forms two combinations: one is a solution of 1·25 parts of creasote in 100 of water; the other, on the contrary, is a solution of 10 parts of water in 100 of creasote." "Concentrated albuminous liquids are immediately coagulated by it; diluted ones, gradually. Fibrin is not altered by it. According to Dr. J. R. Cormack, the only essential part of the mummifying process practiced by the ancient Egyptians was the application of such a heat as would first dry up the body, and then decompose the tarry matters which had been previously introduced, and thus generate creasote." As met with in commerce it has frequently a more or less brownish tinge, and is said to be often adulterated with rectified oil of tar, capnomor, and a substance like almond oil. "These impurities are readily detected by mixing separate portions of the suspected liquid with acetic acid and caustic potash; pure creasote is completely soluble in these fluids; not so the adulterated. Capnomor is similar to creasote in many of its physical and chemical properties, and is frequently associated with the creasote of the shops."

"Creasote when largely diluted is sometimes given internally in order to check obstinate vomiting. If applied in a concentrated form to the exposed pulp of a carious tooth, it frequently affords instant relief in cases of acute toothache. It is also a valuable application, in a very diluted form, in some cases of fetid ulcers, and in many cutaneous affections. If applied to the skin in a concentrated state it produces a white spot, the skin becomes disorganized, and peels off without any attendant inflammation."

Without going particularly into the physiological effects of this substance, for information upon which point I would refer the reader to Pereira's admirable treatise, I would merely state that the composition of creasote is not yet definitely fixed, but analysis seems to point to its being represented by the formula $C_8H_{10}O_2$. Its name is spelt creosote, creasote, and kreasote.

Before turning to the substance, carbolic acid, with which creasote is often confounded, I would point to what Watts and Miller say on this subject.

"The substance known in commerce by the name of creasote, is often merely hydrate of phenyl more or less impure; but the true creasote extracted by Reichenbach from wood-tar is a perfectly distinct body, and does not exhibit all the characters of hydrate of phenyl. It is to the true creasote that wood vinegar, tar-water, soot, and wood-smoke owe their power of arresting the putrefaction of meat and other animal substances." *Watts.*

"Much of the kreasote of commerce is simply carbolic (phenic) acid; but the true kreasote of Reichenbach is a quite distinct body." *Miller.*

Creasote, I should mention, is obtained from the products of the destructive distillation of wood, while carbolic acid is found in and procured from coal tar, the resulting product of the destructive distillation of coal. As Watts remarks, "creasote from wood-tar is a very different thing from hydrate of phenyl (carbolic acid), the so-called *coal-tar creasote.*"

Phenol, hydrate of phenyl, phenylic alcohol, phenic acid, carbolic acid, coal tar creasote is, at ordinary temperatures, a solid, crystallizing in long colorless needles, and having a specific gravity of 1·065 at 18°. It melts at 34°–35°, and boils at 187°–188°. It is contained in considerable quantity in and is commercially extracted from coal tar, the heavy, black tarry matter which, until within the last few years, was a serious nuisance at the gas works, as no use had up to that time been found for it. Phenol can, however, be manufactured from other substances than coal, as salicylic acid, the acid found in the oil of wintergreen, and from the resin of the xanthorrhœa. "It is to phenol that castoreum owes its peculiar odor. The urine of the cow, of the horse, and of man contains sensible quantities of phenol." As obtained from coal tar, in the form of clear crystals, phenol deliquesces easily to an oil by taking up a mere trace of water; a lump of chloride of calcium causes the oil to solidify immediately. It does not redden litmus, smells like wood tar creasote, and attacks the skin like that substance. "Its aqueous solution coagulates albumen; it unites with certain animal substances, and preserves them from decomposition. Fish and leeches die when immersed in the aqueous solution, and their bodies subsequently dry up on exposure to the air without putrefying. Phenol is but sparingly soluble in water, but dissolves in all proportions in alcohol, ether, and strong acetic acid. When shaken up with one-quarter part of water, and exposed to a temperature of 4°, it takes up water and forms a hydrate, which crystallizes readily in large six-sided prisms, and melts at 16°."

The chemical formula for phenol is C_6H_6O.

As to the effect of mixing either of these substances with glycerin, I find nothing recorded in the books, and have made no experiments on that subject myself, but in relation thereto, I may quote from Storer's Dictionary of Solubilities, that "glycerin approaches to dilute alcohol in its solvent power. In general terms, substances may be said to be more soluble in glycerin the more soluble they are in alcohol. A high temperature greatly increases its solvent power."

Phenol is particularly of interest at the present time, as it is the alcohol of the radical Phenyl ($C_{12}H_{10}$), from which the celebrated and beautiful aniline dyes, as well as that important substance picric acid, are derived. "Owing to its antiseptic power, carbolic acid is a valuable topical application in many surgical cases attended with offensive puru-

lent or other discharges. Phenic acid has also lately been extensively used as a prophylactic against the spread of infectious diseases. It was extensively tried by Mr. Crookes, under the sanction of the Cattle Plague Commission; and he has given a careful report upon the subject, from which its efficacy in destroying the infectious matter would appear to be very high. As it is a volatile substance, it possesses the great advantage of being readily diffused through the air."

The importance of the knowledge I have quoted, will, I trust, be sufficient excuse for the dry enumeration of facts which I thus communicate, and if I should in any way conduce to the closer attention of the student to the chemical lecture-room, I shall feel extremely gratified.

It must be remembered that the temperatures mentioned are always according to the centigrade scale, the one universally in use among scientific observers.

RUBBER PATENTS.

BY DR. W. C. HORNE, NEW YORK.

The large number of dentists interested in the use of rubber will be glad to learn that the Boston Dental Vulcanite Company is not yet master of the situation.

The effect of Judge Nelson's decision is simply this, to prohibit the use of the Goodyear rubber without the consent of the patentees. It is presumable that by this time most dentists have had a settlement of some kind with the Boston company for past use of the Goodyear compound; but how about the future? Must they take licenses from the Boston company on its own terms? It seems not; for in two cases, one in Cincinnati, in December, and another in Albany, in February, the agents of the company withdrew their suits in the United States Courts, on the showing by the defendants (dentists) that they were using a rubber under another patent, entirely different both in its components and manufacture from the Goodyear article.

While the Goodyear patentees eschew a trial, the manufacturer of the new compound guarantees protection to his purchasers in their use thereof from any suits in law or equity. Supposing that this new rubber, which is made with less than the minimum quantity of sulphur specified in the Goodyear patents, by that means circumvents them, the Cummings claim *for the application of rubber to dental purposes* still stands in the way.

As is well known, the legality of this claim was affirmed in Boston in the Wetherbee case; and it was in opposition to this patent that the New York Dental Protective Society originated. Influenced by the

representations of their counsel, the managers were induced to contest the Goodyear patent, at a cost (as it proved) of $12,000. Half of this sum ($6000) was advanced by a few of the managers, several of whom were not using rubber, and at the termination of the suit they find themselves out of pocket to more than this amount, and obliged to contest a claim, prosecuted by their late counselors, for $6000 more than they have already received. It is said in extenuation, that this is the only important case the distinguished senior counsel has had since he left Boston, and of course he must get all he can out of it.

In this state of affairs, unsupported by the profession, for whose benefit they had incurred such heavy responsibilities, the managers were unable to appeal to the Supreme Court, or to make any defense against the Cummings suit, and appearances indicated that the Cummings patent would be affirmed in default of any appearance by the defendants.

But instead of continuing the original suit, a new one has been brought against Dr. Gunning, a gentleman who has both the means and the disposition to defend himself, and who is sanguine of success. Under the direction of Chas. O'Connor the case will be thoroughly tested on its merits. It is eminently proper, then, that dentists should have nothing to do with the Boston Dental Vulcanite Company, neither to use its rubber, nor take *its* license, nor any other.

PROCEEDINGS OF DENTAL SOCIETIES.

PROCEEDINGS OF THE ODONTOGRAPHIC SOCIETY OF PENNSYLVANIA.

At a monthly meeting held at the Philadelphia Dental College on Monday evening, January 6th, 1868, the following paper was read by W. H. Trueman, D.D.S.:

AN ESSAY UPON THE RELATIVE ADVANTAGES OF CRYSTALLIZED GOLD AND GOLD FOIL AS A MATERIAL FOR FILLING TEETH.

In presenting you the present paper, gentlemen, it is but just to remark, that it is written under the influence of a strong bias in favor of foil, and against the use of gold in a crystallized or spongy form, except for special cases. As it is intended rather to open the discussion which may follow, than to present an exhaustive or impartial treatise upon the subject selected, and as ample opportunity will be given to correct any mistakes the writer's prejudice may lead him to make, it is hoped this will not be considered objectionable.

Every one is entitled to his own opinions, and is under no obligation

to change them unless they are proved beyond all doubt to be false; and has a perfect right to express them so long as he does not interfere with or trample upon the rights of others to the same privilege. I have taken as my motto the poet's couplet—

> Be not the first by whom the new is tried,
> Nor yet the last to lay the old aside.

And while preferring the well-beaten track, I am not exclusive, but rather try to be eclectic in practice; always willing to try any professed improvement when opportunity is given to exercise judgment upon its merits; but opposed in toto to the practice which is becoming so common in our profession, of blindly using every new "agony" upon the bare recommendation of interested parties, or upon the experience of those who are confessedly ignorant of that they attempt to commend. In the medical profession, those who make, and those who publicly recommend patent or secret preparations are allowed to sing the same monotonous song. We would do well to follow the example of our elder brethren in this particular, and until we do we cannot expect to stand with them upon the same broad platform.

While we may allow a mechanic to seek the protection of a patent, a professional man whose capital stock is rather brain than muscle, and who is supposed to occupy a higher level, should consider it beneath his dignity. The fact that nearly if not quite all the forms of crystallized gold which have been or are now before the profession, came into existence with the same congenital scar, I admit has done much to hide the beauty I might otherwise see in them; yet above and beyond all this, there are a number of difficulties which have yet to be overcome before they can take their place beside the well-tried, always faithful foil—much less supplant it.

The claim or assertion that they require less skill in manipulation, can be no recommendation to any one who desires to exalt his profession. The experience of the past shows that all the ideas which have been advanced to enable a dentist to work without the exercise of skill, opens the door to quacks and charlatans, whose miserable botch-work casts its dark shadow upon the future of our profession.

In evidence of this, I need only refer to the well-known, much abused "amalgam"—a very good thing in its place, but in the hands of poor ignorant fools, who despised instruction and disliked labor, has done an immense amount of injury alike to the teeth of their victims and the reputation of our profession; or to the "almost forgotten" sponge gold (of which I shall presently speak), which, because it required less labor, was thought to require none. In the hands of careful operators it proved to be quite useful, and is used by some to this day with success, showing that faulty manipulation had at least something to do with its

failures. And here, I contend, lies one very great advantage of foil—it is honest, and faulty manipulation is at once seen, at least by the operator. A filling improperly put in or imperfectly condensed, shows its defects at once;* while a filling of plastic or crystallized gold, like the material itself, is shrouded in mystery; like those who make it, it endeavors to keep you as much in the dark as possible.

I do not mean to say that it is impossible to put in an imperfect foil filling without knowing it, or that all fillings which fail are necessarily imperfect, or that all imperfections in fillings are caused by either want of skill or care in the operator or some inherent defect of the material itself. You will please observe, that this introduction deals only in generalities; in fact it is intended to be quite general in more ways than one. We all recognize the truth that the most successful will sometimes fail.

So much, gentlemen, for the introduction; and now for the subject itself.

In order that we may perfectly understand each other, let us review, if you please, as briefly as may suit our purpose, the history of crystal gold in its connection with our profession. For although it is contended in certain quarters that it is quite a new idea, in fact an infant of but few years growth, I hope to be able to prove from undisputed authority that it has led a long and varied life, and is as old as the hills from whence it originally came, and that its present revival or resurrection, which has provoked this discussion, is but a confirmation of the old saying, that "history repeats itself." The first notice I have been able to discover of crystallized gold in connection with our profession, is in an article by Dr. C. T. Jackson; and as I shall have occasion to refer to it again, perhaps it will not be out of place to read it to you, or so much of it as our purpose requires. You will find it in volume sixth, second series, *Silliman's Journal*, page 187. It is entitled, "A New Method of Extracting Pure Gold from Alloys and from Ores. By C. T. Jackson, U. S. G. S." It reads as follows:

"The following method of obtaining pure metallic gold in the form of a spongy mass has been practiced by me for several years, and no account of the process has to my knowledge heretofore been published; it is very useful to the chemist and to the manufacturer, and is more economical than any other method that I am acquainted with. After separating the gold from silver by means of a mixture of nitric and hydrochloric acids, as is usually done, the solution containing gold and copper is to be evaporated to small bulk, and the excess of nitric acid is thus driven off.

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* Dental News Letter, vol. ix. page 137; Ibid., vol. x. page 58, Proceedings of American Dental Convention.

"A little oxalic acid is then added, and then a solution of carbonate of potash sufficient to take up nearly all the gold in the state of aurite of potash is gradually added. A large quantity of crystallized oxalic acid is then added, so as to be in great excess, and the whole is to be quickly boiled. All the gold is immediately precipitated in the form of a beautiful yellow sponge, which is absolutely pure metallic gold. All the copper is taken up by the excess of oxalic acid, and may be washed out. Boil the sponge in pure water so long as any trace of acidity remains; and the gold is then to be removed from the capsule and dried on filtering paper. It may be pressed into rolls, bars, or thin sheets, by pressing it moderately in paper. I have made several useful applications of the gold sponge thus prepared, and had a tooth plugged with it in October, 1846, to which purpose it is well adapted. By moderate pressure, the spongy gold becomes a solid mass, and burnishes quite brilliantly."

In quite a number of the older works on chemistry I find attention called to this action of oxalic acid. In some it is stated that the gold is thrown down in the metallic state, and in others in a crystalline form. But this article is, as far as my search has gone, the first introduction of crystallized gold to our profession, and I find* Dr. W. H. Dwinelle, in a paper upon the subject, gives to Dr. C. T. Jackson this distinguished honor. In noticing it he remarks that the gold obtained by this process is in an amorphous condition, resembling more a powder held together by a slight affinity. The precipitate of gold by oxalic acid is noticed in an editorial in the *American Journal of Dental Science*, Oct. 1853 (vol. iv. N. S. 174), and objection is made to it from the same cause. The process seems to be a very delicate and uncertain one, and very often produces a result which at first sight does not appear to be crystalline, but upon examination will be found to consist of minute crystals, which can be made to unite with moderate pressure, and I think would make as reliable filling as any other form of crystal gold. When the process works well (if you will allow the expression), it produces a result so nearly resembling the preparation now known as plastic gold, that I have been led to the conclusion that they are identical. Microscopic examination reveals the same general structure, and about the same appearance of crystallization; it would be difficult if not impossible to distinguish them.

This idea, so freely given, does not seem to have attracted much if any attention. We hear nothing of crystal gold until 1853, when Mr. A. J. Watts, of Utica, N. Y., and Mr. Joseph Barling, Maidstone, Kent, England, appeared in the field almost at the same time. Mr. Barling does not appear to have patented his preparation; at least I cannot find any record of it in the reports, nor have I been able to glean anything

* The American Journal of Dental Science, New Series, vol. v. 345.

of his process.* His material is represented as occurring in irregular rounded masses or pellets, a little larger than an ordinary sized pea; it was a lighter color upon the surface than within, and presented the appearance of having been annealed. When these pellets were broken open they revealed a spongy mass, which appeared to be composed of very small particles or crystals united together, forming a dense and delicate network. It was said to work very well, forming a hard, dense filling, capable of receiving a fine finish, giving a surface which could be engraved without difficulty. The objections to it were—its want of a sufficient degree of plasticity, and a disposition to crumble on being broken, causing considerable waste in using. These observations were made upon some of the early specimens. It was said to have been very much improved.

It appears† that about the same time, and without any knowledge of the experiments or success of Mr. Barling, Dr. A. J. Watts, a chemist of Utica, New York, was pursuing a series of experiments with reference to obtaining an article of sponge gold, which should meet the wants of the profession. As a result of his labors we find the following record in the U. S. Patent Office:

"Report, part first (Arts and Manufactures), 1853, page 183.

"Patent. No. 9691. Alfred J. Watts, of Utica, N. Y.

"Improvement in process for preparing gold for filling teeth.

"Patented April 26th, 1853."

The nature of this invention consists in dissolving gold in mercury, and after treating with heat or otherwise, dissolving out the mercury by nitric acid, and then subjecting the now conditioned but as yet unfinished gold to the action of a particular heat, whereby it is rendered coherent, soft, and malleable, thus fitting it for the purpose of filling teeth.

Dr. Watts' idea seems to have been more fortunate than his predecessor's. There is an old proverb, that "stolen kisses are the sweetest," and so it seems, for in less than a year this material was manufactured and advertised by at least three different parties‡—the original patentee, under the name of A. J. Watts & Co., and N. P. & H. R. White, both firms being located at Utica, New York, and Messrs. Taft & Watt, of Xenia, Ohio. They all evidently worked by the same process; the difference between the materials produced was caused, as far as I have been able to discover, by the proportion of gold and mercury in the amalgam submitted to the action of the nitric acid, and to the manipulation of the crystals after they were formed in the process of annealing. Judging from the record, I cannot help but think their

* American Jour. Dental Science, vol. iv. 349 (April, 1854).

† American Journal of Dental Science, New Series, vol. iv. p. 349.

‡ Advertisements, cover Dental News Letter, April, 1854.

process was far more reliable and certain in its results than those by which Lamm's shred and Morgan's plastic golds are now produced. After the sponge-gold makers got their "machinery greased," we hear very little complaint of the variable nature of their preparations. And when we remember that with them the idea was entirely new, and the difficulties to be overcome imperfectly understood, both by the makers and those who used it, we must admit they succeeded well.

As a matter of curiosity, allow me to copy their advertisements (the first I find of this material) from the covers of the *Dental News Letter* for April, 1854. I have a purpose in being thus minute in tracing the history of these preparations, and ask your particular attention to the very striking analogy between what was known as sponge gold, and that which has lately been introduced as fibrous, shred, crystal, or plastic gold. The advertisements, the articles recommending, and those condemning the modern crystal gold, seem to be almost literal reprints of those originally written upon sponge gold.

The first advertisement is headed:

"WATTS' PATENT PREPARED GOLD FOR FILLING TEETH.

"This is a preparation in various forms, of a spongy, laminated, or crystalline character, so soft, plastic, and adhesive, as to admit of being welded, piece by piece, by simple pressure, into a body so solid, that it may at once be beaten into foil or drawn into wire. It possesses the following advantages over foil:

"1. It must necessarily be Pure Gold.

"2. It may with ease, and with comparatively unpracticed hands, be worked up to any external form in the tooth with a perfection and beauty which it is believed impossible to attain with foil in the hands of the most skillful.

"3. It adheres to the tooth with such tenacity that it can only be extracted by drilling or breaking the tooth, and when thus removed the plug will be found covered with numerous small particles of bone adhering to it.

"4. It requires for its use less practice and skill to accomplish good work, while it amply repays the skillful operator in the production of splendid fillings.

"5. It makes an absolute solid plug."

In about the same strain we have—

"WHITE'S PREPARED GOLD FOR FILLING TEETH.

"The undersigned take this method of informing the profession that they have prepared a gold for filling the teeth that excels foil in every particular, making a more compact, solid, and perfect plug, and with less skill than is required in foil filling. So solid can it be pressed together that it may be rolled into plate or drawn into wire. The ra-

tionale of it is: the gold being held in a crystalline form, when it is pressed together the crystals interlace each other in every direction, and being soft, it is easily pressed into all the inequalities of the cavity.

"*Directions for Using.*

"After having cleaned, prepared, and dried the cavity in the usual way, break from the gold with a pair of filling pliers such a piece as may be easily pressed into the cavity (or first roll lightly between the thumb and finger), pack this thoroughly at the bottom with a burr or other rough instrument, then add other pieces, and pack in the same manner (the more each layer is packed the harder will be the plug), until it is as full as desired, then burnish and finish as usual.

"The profession are urgently requested to give this preparation at least a trial, and although it will require some little practice to handle the gold properly, still much less than foil. Yet any one can make a beautiful plug on the first attempt by following the directions.

"From a series of experiments recently completed, we are induced to believe that we are now producing an article that combines every quality that is requisite in a plugging material."

These gentlemen are exceedingly modest; I must confess they rather "top" the latter-day spongers, but you must remember advertising was cheap then, and the opportunities of gratuitous advertising the numerous dental associations now afford were not then enjoyed. They had not the opportunities now presented of expatiating upon the advantages of "submarine" and "two minute" fillings. In the present day, when so many of the profession can be reached in the various professional conventions and societies, there is no occasion to make such a "spread." What is the great "bait" held out in these two advertisements (and I take these as a type of the manner in which all these preparations, without exception, have been introduced to the profession)? Do you not see the great stress laid upon the fact that it requires "less skill?" By following the directions, you can succeed the "first shot." Quite encouraging for the beginner, who trembles at the thought of the many hours of anxious labor in learning to fill teeth. Quite so, and the student of to-day need not feel down-hearted at the thought that this is one of the things of the past; the same claim has been made for every form of this material which has been offered, perhaps not in the same words, but the same in substance; sometimes with a little incidental remark to qualify it a little, but they all give you the assurance, if you follow the directions and use the right tools, that success is sure to crown your efforts.

Less skill, not that it enables the skillful operator to make better work, for all the writers upon the subject, then and now, even the most enthusiastic, admit that in skillful, careful hands, gold foil makes a filling

leaving nothing to be desired in the material (that is, in the form of the material); but with this stuff it is not necessary to use much skill, as it enables a man who has not the skill to be a dentist, to "stuff" teeth. Is this exalting to the profession? Pardon me, but was it not a "judgment" upon those who encouraged it, when they got their fingers burnt so badly?

You cannot fail to have observed that all the claims of superiority in this material are based upon assumption; in all the various papers or essays upon it, for and against, I have met with, there is not one single philosophical examination of its real merits, or any well-directed search into the cause of either its success or failure. The experience of its advocates seems to have been very much at variance: while some assert that to insure success it must be kept absolutely dry; others, again, finding the dry sponge to crumble, announced that the only true method was to use it "wet." And is it not reasonable to suppose that those fillings, which, when removed, were found studded with particles of dentine,* may have been put in by some aquatic operator, who, in experimenting upon the various fluids with which to moisten his sponge, had stumbled over glue water! And here allow me to throw out an idea (I hope no one will patent it): John Hunter tells us that when fillings are obstinate and persist in coming out, they are to be secured by wooden pegs. How would it answer to glue them in?

Some assert that it should be inserted in as large pieces as the cavity will hold; others, again, deny this, until we find all sizes of pellets are recommended, from a single crystal up and down; in fact, I do not find any two of its advocates agreed upon the manner in which it is to be used, or the instruments to be employed. Each one seemed to have ideas of his own upon all these points, and naturally wishing to advance the interests of the profession, lost no time in imparting to the inventor the results of his experience, and some little suggestions, which would render the gold perfect, until (judging from his communication to the profession, as found in the *Dental News Letter*, vol. ix. page 135) the poor fellow's patience was completely exhausted, and taking unto himself one or two confidential advisers, he resolved to "go it alone," and as a punishment for this intrusion withheld from the profession† his "very best stuff" until they should learn to behave.

There is a striking originality in the methods adopted to test its working properties.‡ One gentleman, speaking of crystal gold, said he had

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* Proceedings of American Dental Convention. Dental News Letter, vol. x. page 52.

† American Journal of Dental Science. New Series, vol. v. page 295.

‡ Proceedings of American Society of Dental Surgeons. Dental News Letter, vol. ix. page 9.

thoroughly tested it by working it in water, saliva, flour, and other similar substances, yet without impairing its adhesiveness or preventing its being formed into a solid plug. Another gentleman, alluding to the tests which had been applied to sponge gold, suggested that it might be improved by mixing with "cod-liver oil," it is supposed to grease the crystals and facilitate the interlacing so often spoken of.

The test which seems to have given the most satisfaction, and one very generally relied upon as evidence of a good, solid, well-welded plug, consisted in filling a tooth and afterward breaking it open, taking out the filling, annealing it, and rolling into plate, or drawing into wire; this, we are told,* they were able to do perfectly, and so they could if they had taken two or three sheets of foil, loosely rolled them into a ball or pellet, and treated it in the same manner.† Even the loose brown powder in which gold is thrown down by the protosulphate of iron, treated in the same manner, would have given the same result. This is no proof whatever of the density of the plug, whether it be of foil or sponge gold.

We are told that they were able to fill a given cavity with sponge gold so as to make the filling weigh from ‡$\frac{1}{4}$ to $\frac{1}{8}$ more than a similar one of foil would: and also that they were able to put fillings in the mouth that had a much greater specific gravity§ than molten gold, and to give a surface harder, and more dense than coin gold,|| or rather coin itself. (I am surprised that some of these philosophers did not take out a "patent" for a new method of making gold coin. It certainly would save an immense amount of labor in rolling and drawing the plate, and as they tell us it takes a very fine impression, seems to have been just the thing for the purpose.) If these experiments upon its density are correct, the crystal gold they used must have had an advantage in this respect over that we now have, or their foil must have been very much inferior to ours. I have witnessed the same experiment performed with great accuracy, and the two plugs, one of foil, the other crystal gold (both of which were made in the same cavity, drilled in a hard steel

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* American Journal of Dental Science. New Series, vol. iv. page 351.

† Gold is precipitated from its solution in brown powder, which, by burnishing, soon recovers the metallic lustre, and which aggregate by percussion. If mass be heated to redness (*i.e.* annealed) before hammered, a perfectly aggregated (*i.e.* solid) metal can be obtained without having heated it to fusion.—*Regnault's Elements of Chemistry*, vol. ii. page 323.

If (the gold), after being precipitated from its solution by iron, it is washed and strongly compressed in an hydraulic press, it adheres together, producing a ductile and malleable mass, which may be forged, laminated, or drawn into wire.—*General Notions of Chemistry.* Pelouz & Fremy (1854), page 300.

‡ Dental News Letter, vol. vii. page 173 (April, 1854).

§ American Journ. Dental Sci., vol. v. pages 286, 408.

|| *Ibid.*, 250.

plate), weighed precisely the same; while under the microscope the foil filling showed a much better impression of the bottom of the matrix.

I think you will all acknowledge that this history of sponge gold, a substance or material which is admitted to have been a failure, all but complete, would require very little change to make it a history of the present fibrous or plastic gold,—a preparation which I do not consider new even in name; the same names were in use years ago, and were as complete misnomers then as they are now. In attempting to exhibit to you the relative merits of crystallized gold and foil, no better method is suggested than that of giving you the history of an analogous preparation, and showing by the failure of one the inevitable fate of the other. Before I leave this part of the subject, I ask your attention to the report of a committee appointed by the Pennsylvania Association of Dental Surgeons, Oct. 18, 1853, to examine into the merits of Sponge Gold. After over two years spent in investigation, at a meeting of the Association, held Dec. 6, 1855, they made the following report:*

REPORT ON SPONGE GOLD.

To the Pennsylvania Society of Dental Surgeons.

GENTLEMEN:—Your committee appointed to test the value of sponge or crystallized gold as a filling for carious teeth, would respectfully report: That from all the knowledge they can gather from experience of members of the profession, and also from the experience of members of the committee, they do not consider it advisable to recommend it to the profession as a reliable or safe material for filling teeth. With one exception, your committee is unanimous in their determination never to use it in their practice; one of the committee thinks he may use it in some cases, where it would be used to fill out or patch a foil filling, and where it would not come in contact with the bony parietes of the cavity. No time, labor, or expense is saved to the operator. The amount of pressure necessary to make an apparently good filling of crystal gold is greater than is needed for gold foil; and all, even its warmest friends, admit that it takes more time. If a more perfect and enduring filling was made by this extra labor and time, your committee would deem it time well spent; but this has not proved to be the case; the fillings placed by your committee have, in nearly every case, been removed, and the teeth refilled, in consequence of the imperfect condition in which they were found after a lapse of only a few months. The edges of the fillings in some cases crumbled and admitted moisture freely around them; in others, the teeth were very much discolored around and under the fillings, the discoloration being so great as to demand the removal of

* Dental News Letter, vol. ix. page 90.

the filling. Your committee have the report of some gentlemen who seem to have succeeded in making very perfect fillings, which so far stand the test of time and wear, of the very material which the manufacturers admit to be a bad article, and which they wish returned to them, that they may furnish a better in its stead. The only difference between that furnished two years ago and the present preparation, seems to be a property of greater adhesion; in all other respects it is open to the same objection as the earlier specimens.

With these views, your committee cannot recommend the present preparation of sponge or crystal gold for filling teeth, if the object aimed at be their preservation for a series of years.

All of which is respectfully submitted. (Signed)

E. Townsend,	T. L. Buckingham.	Chas. A. DuBouchet,
J. D. White,	J. H. McQuillen,	Jas. M. Harris,
J. F. B. Flagg,	F. Reinstein,	Daniel Neall.

All who know anything of these names will, I think, agree that they were well able to judge of the merits or demerits of the article submitted to their judgment. Time has proved the correctness of their verdict.

In an article written by Dr. McQuillen* in answer to some insinuation thrown out that the committee were prejudiced, the investigations are shown to have been impartial, patient, and thorough. It is rather remarkable that recently a committee appointed by the same association to examine the present forms of crystal gold, should have presented a report embracing and confirming all the principal points brought out in this, which is, you will admit, another link in the chain which binds them together. I say it is rather remarkable, especially as from personal intercourse with the members of that committee, I have every reason to believe that at the time of making the investigation, the existence of this report was never once thought of; nor is the coincidence rendered less striking when the committee were charged with being "biased;" a charge which was proved to be as groundless as that urged against their predecessors a dozen years ago.

To commence the new era of crystal gold, we have patent No. 56,765, granted to Emile Lamm, of New Orleans, La., July 31, 1866, for a method of preparing gold for dentists; in which he claims the right to use saccharine substances to precipitate gold from its solution.†

The first I heard of this, my attention was called to two fillings which had been placed in holes drilled in a piece of ivory; one had been put in dry, and in the other the crystals had been worked up with the saliva in a mortar before being introduced; they appeared to be equally hard

* Dental News Letter, vol. ix. page 185.

† Nearly if not quite all saccharine substances are converted into oxalic acid by the action of nitric acid, which is always pent in aqua regia.

and solid. One of the great points made was, it would work under water. One gentleman told me he never took the trouble to dry out the cavities when using it; he rather preferred to have them filled with saliva, as it made the gold work better. Another, finding it sometimes difficult, especially in upper teeth, to fill the cavity with saliva, thought it worked quite as well to mix it up in a mortar first. I was not informed whether he used his own or his patient's "spit;" it might possibly make some difference, especially if one or the other used tobacco. This new preparation, it was soon discovered, like its elder brother, abhorred moisture, and to have a "ghost" of a chance, must be put in absolutely dry. Some contended that to make it weld perfectly, it should be introduced into the tooth red hot: it is to be presumed they learned how to weld in the blacksmith's shop. The plastic gold was introduced with a little more caution, but like its predecessor, was not wanting in its peculiar virtues: the most prominent was, its "excessive plasticness," its purity and uniformity. The only advantage it has over Lamm's, as far as I can observe, is that it is a little younger, it is the last "agony."

Let us examine the chemistry of these golds, for you will remember, it is claimed that the two forms of crystal gold especially under discussion are entirely new preparations, each produced by a process never before known. In what they differ from each other, or from those forms of crystal gold which have preceded them, we are not informed. Each maker claims that his article is the best, but gives no reason why, except it be because he makes it.

Let us examine, if you please, how far these preparations can differ. If I mistake not, the "books" inform us that all the elements which can be made to crystallize, crystallize in regular, definite, and characteristic forms. This property of the same substance always crystallizing in the same invariable form is often made use of in analysis, and is always relied upon. Therefore, if gold always crystallizes in the same definite form, then it must necessarily follow that crystal gold, no matter by what process obtained, must always be the same. The only difference being in the size of the crystals.

All the works I have examined in reference to this subject, agree in limiting the crystals of gold to the cube,* and those forms derived from

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* Gold crystallizes in cubes or octohedrons.—*Miller's Chemistry*, Part I. page 113.

Gold crystallizes in quadrangular pyramids or in octohedrons. It is found in nature in different forms, derived from the cube.—*Pelouz and Fremy's Chemistry*, page 280.

Gold is found crystallized in cubes and its derived forms.—*Ure's Dict. Art. Sci.*, vol. i. page 939.

Gold may be crystallized by fusing, when it assumes the shape of cubes modified by facets of the regular system.—*Regnault's Chemistry*, vol. ii. page 328.

See also *Fownes' Chemistry*, page 317, *Turner's Chemistry*, page 402.

it; this I have found true in Lamm's and Morgan's crystal gold; sometimes the crystals are lengthened out into prisms, or rather joined together, forming long crystals or prisms. I have also found triangular-shaped particles, very brilliant, which cannot be properly considered crystals; they are known, I believe, as spangles. The most careful investigation has failed to detect any material difference between Lamm's and Morgan's gold. I have sometimes thought the crystals of Lamm's were larger and more brilliant, but more careful examination of specimens mounted in different ways, and with various modes of illumination, has shown them to be very nearly alike; this has been confirmed by the observation of others more experienced with the microscope than your essayist.

Each article has its admirers, who profess to find a great difference between them, and gravely inform us that they are each produced by an entirely different process: whether the statement is correct or not we are very carefully left to guess, and perhaps I may be allowed, after several months' experiment, to guess they are produced by the same means, and that the original receipt of Dr. C. T. Jackson gives us all that is essential; and that oxalic acid, either in its mature or nascent state, is the active agent in producing both those forms of crystal gold, and it may be that of Dr. Watts also, for we are informed by one of his friends that he soon discontinued to use his patent process, having found one entirely different which answered his purpose better. It must be remembered that in all chemical operations a great deal depends upon manipulation; this holds good with the precipitation of gold by oxalic acid. I have found it very uncertain. In more skillful or experienced hands, or when the process is made a business and the operation conducted on a large scale, it is reasonable to suppose it would be more certain than with a comparative novice working with a few grains at a time. The fact that well-formed crystals have been produced by this process is sufficient evidence of what it will do.

Whenever gold is found crystallized, either naturally or artificially, it is always in cubes, and the form derived from them.

I presume it is not necessary to say anything about the preparation of foil. Any dentist who wishes to may examine, and trace this material through its various stages of manipulation, from its rocky hiding-place to his patient's mouth. There are no patents or well-kept secrets to mystify or mislead him here.

Foil, with all its advantages, has many disadvantages. It requires skill, patience, care—it requires labor, practice, experience, to properly work it. It requires an educated brain, guiding well-disciplined muscles, to use it successfully. The student must often bear many crosses before his eyes behold the glittering crown. It requires not only time to learn to use it, but time to use it properly. It cannot be slighted with

impunity; and in this fast age, these are disadvantages which its well-earned reputation (in the minds of some) hardly outweighs. It requires a degree of pressure for its proper consolidation sometimes difficult to obtain, especially in frail teeth or in places difficult to get at. This I consider the strongest objection that can be urged against gold foil (that is, if we admit gold to be the best material for filling teeth); it has others, but they can be overcome by careful and discreet manipulation.

That it can be wrought into useful and durable fillings, the experience of over a century has amply proved. That it can be used in a vast majority of cases with certainty and success, none can doubt; though to make it thus successful, we confess it sometimes requires more skill than some are willing or perhaps able to bestow.

It is said that crystal gold packs or welds with more ease and less pressure than foil; this I freely admit. Why is this? What is required to perfectly weld or unite two bodies? Nothing more than the absolute contact of the two surfaces; if two separate particles of the same substance are brought within their mutual spheres of attraction, they are united, they become one body; the more nearly you approach to this the more perfect is the union obtained. This rule holds good throughout the universe of matter. These little crystals, produced by the action of nature's unerring laws, all as it were cast in the same mould, their little facets or surfaces perfect planes, from their peculiar shape readily adapting themselves to each other, when brought in contact, require but very little pressure to produce a comparatively solid mass, if that pressure is applied in the right direction. And here lies one of the weak points of crystal gold—the pressure must be direct; this its advocates, I believe, without exception, now admit is essential: they are beginning to agree that blunt or flat instruments and direct pressure are indispensable to success. Any sliding motion among the crystals, an indiscreet thrust of the instrument may produce, after they are in even the slightest degree united, impairs, and, in a measure, destroys their cohesion. And why? It is necessary to make these crystals unite, that these perfect planes which form their sides or surfaces should be brought together, plane to plane, surface to surface, that they should fit each other: this they readily do because they are all alike; now, if after a number of these have been brought together and partially united, they are made to slide over each other, do you not see that these points of union are torn asunder, their smooth, plain surfaces marred; and when an attempt is made to unite them in a new position, this roughness preventing that close contact, destroys in the same measure the cohesion that would otherwise take place?

Mark you: this effect may take place a dozen times while putting in a plug, making as many imperfect seams which will extend just so far as the crystals have been disturbed; these imperfections, you must re-

member, are made in a preparation consisting of innumerable small particles, held together entirely by the force of cohesion; did they exist in a foil filling, they might not injure it in any great degree, for the separate particles of which it is composed are larger and less numerous, and also do not depend entirely upon the cohesion; for in what I consider the most objectionable form of using foil (where pellets of adhesive foil are used, Dr. Arthur's method), this cohesion is assisted in a great degree by the different lamina of foil being driven into each other by the sharp points of the plugger, and also by being wedged between the walls of the cavity. But the crystal gold depends entirely upon the cohesion of its particles for its integrity; it cannot be wedged, it cannot be made to expand laterally, nor can it be made to fit closely to the walls of the cavity without danger of sliding the crystals over each other, and thus preventing their perfect union. These imperfections may be numerous; they are very apt to be more numerous just at the edge of the cavity produced by the operator's attempt to make his edges perfect; he may make them very accurate, finish up very nicely, dismiss his patient, congratulating himself upon the splendid operation he has performed, never dreaming of the little "rats" which lurk beneath it. A few months may reveal them; these little pellets of crystals, imperfectly united, will loosen and drop off, leaving the vital point of the filling exposed. This, gentlemen, is no fancy sketch; it occurred to the writer in two out of three fillings put in, and I suppose it has occurred to the other, though I have not seen it. A professional friend, whose ability is undoubted, has just given me the history of two or three such cases, and I have heard of them from many others. In order to avoid this it has been recommended to line the walls of the cavity with three or four lamina of foil. I was much amused at the experience of a dentist who adopted this plan; he commenced with filling his retaining points with foil; then he lined the cavity with foil, filling up with crystal gold; next he laid the foundation of the filling with foil, and finding that the more foil he used and the less crystal gold, the better plug he produced, he kept on using less and less until at last, when he had entirely left out the crystal gold, he thought he was pretty nearly on the right track. When he began with crystal gold he thought it was the *ne plus ultra*, and for a long time abandoned foil entirely. Remember that his experience was not with the old crystal gold, but with Lamm's and Morgan's. You may read instances so near like it with the old that it is unnecessary to designate.

We very frequently read and hear of the interlacing of the crystals, and this is the only explanation I have seen offered to account for the solidity crystal gold fillings are supposed to possess. We are told that the fibres, the shreds, the crystals, interlace with each other and bind the mass together; perhaps I have been unfortunate, never having seen any

fibres, or shreds, or crystals in any specimen examined that could be made to interlace any more than so many marbles, or brick-bats, or cobble stones. I know that when you take a mass of this gold and tear it asunder, you draw out what appear to be fibres; these are nothing more nor less than a number of crystals slightly united; a very low power of the microscope will readily show this. This gold consists of cubic crystals; if they were laid upon each other accurately, they might be made to interlace in the same manner that bricks do, when built into a column, but as they are and must be used by the dentist, they are no more interlaced than would be so many bricks dumped from a cart in the street; they are all in confusion. Whenever they come in contact under pressure they unite, but with my present knowledge I cannot see how they can be made perfectly compact and solid, unless sufficient pressure is brought upon them to alter and change their shape: in other words, to crush them together. This peculiar shape is such that it would be impossible to build them up, crystal by crystal, so as to leave no interstices; as they are used, I cannot divine how they can be placed in, even in small quantities at a time, without bridging over and leaving little cells all through the filling, and I am yet to be convinced that sufficient force can be used in the mouth, even with the mallet, to completely obviate this difficulty.

This objection is not the greatest nor yet most important. Can these crystals be accurately adapted to the walls of the cavity, so as to perfectly exclude moisture? It is admitted that these crystals can only be condensed in the line of the force applied; they cannot be made to spread, to expand; we have also seen that there is danger in applying the force in more than one direction. How often can direct pressure be made toward the walls of the cavity without condensing the gold, tearing it asunder, and condensing again? an operation always producing injury which it is impossible to repair. Suppose the force is applied toward the bottom of the cavity, what certainty is there that the filling is solid at the walls, or that it even touches them? Experiments carefully performed out of the mouth on teeth held firmly in the vice, the filling being driven home with a hammer (not mallet), have convinced me that to obtain accuracy at this point is no easy matter,—the microscope often showing a line at the junction of the tooth and the plug where the crystals, instead of lying close to the walls of the cavity, stand out in all directions, leaving little spaces between them; and remember that these little spaces possess the remarkable power of inviting the fluids of the mouth to "walk in." When this perfect adaptation is so difficult to obtain out of the mouth, how much harder in! and how long can a filling be expected to remain when this condition of affairs exists? Many of those who took hold of crystal gold a year ago, and very highly recommended it, I find returning to foil: we often hear of its failure. Some-

times the dentine softens around the plug; sometimes the tooth turns dark, and appears to shrink from the filling, presenting very much the same appearance so frequently found with the old-fashioned amalgam; and often, very often, coming out piecemeal. These appearances have frequently been referred to acid. I have tried very often, but have yet to find any trace of free acid in either Lamm's or Morgan's gold, and do not think any effect would be produced on the teeth by a quantity so small that chemical tests would not detect it. Its peculiar crystalline arrangement, making it very difficult to accurately adapt it to the walls of the cavity, the liability to imperfections the operator can neither see nor remedy, and the almost impossibility of making a compact and solid plug, will, I think, fully account for the failure and disappointments which have followed its use.

In conclusion, there are three points in which foil stands unrivaled: the ease with which its separate laminæ can be adapted to the walls of the cavity, the certainty with which the filling can be made solid, and the property of expanding laterally under pressure, making its adaptation perfect.

We want no further guarantee of its purity than the fact that any alloy that would make it unsuitable for the purpose of filling teeth would render it so harsh and unmanageable that it could not be worked,* or produce so marked an effect upon its color that the practiced eye would find no difficulty in detecting it.

Quite an animated discussion ensued after the reading of Dr. Trueman's paper, in which Drs. Kingsbury, Head, McQuillen, and others participated, during which very decided exceptions were taken to the sweeping denunciations against the use of sponge gold. The unavoidable absence of the regular reporter prevents the presentation of a synopsis of the remarks.

BROOKLYN DENTAL ASSOCIATION.

(Collated from the Transactions at the meeting held January 6th, 1868.)

BY JNO. M. CROWELL.

Dr. W. H. Atkinson advocated the propriety of admitting delegates from all dental societies and associations in America, to the American Dental Association at its next meeting at Niagara Falls.

Dr. J. S. Latimer stated the determination of himself and others not to use rubber, in consequence of the exorbitant price demanded by the

* Gold loses its malleability by acquiring $\frac{1}{500}$ of its weight of arsenic.—*Hare's Chemistry*, vol. i. page 290.

The $\frac{1}{2000}$ part of antimony, bismuth, or lead destroys the ductility of gold.—*Ure's Dict. Arts and Science*, vol. i. page 946.

rubber company for annual licenses, and his intention to substitute platina alloyed *with palladium.*

Dr. J. M. Crowell.—The alloyed platina that is sold by S. S. White answers a very good purpose for partial dentures, where two or more teeth are standing together to be inserted; but when a tooth stands alone, it is not sufficiently stiff; pure palladium makes a good plate as to stiffness and lightness, *but is too* brittle and liable to crack.

Dr. Weeks called attention to the new rubber without sulphur; licenses $50 for the term *of the patent*, and the compound $5 per pound.

Dr. J. S. Latimer stated that the small fragments of a tooth crushed between linen cloth and mounted, gave as satisfactory an example of the structure of the organ for microscopical purposes as the most carefully prepared and *mounted section.*

On the discussion of the subject for the evening, "Dental Pulps and their Treatment," Dr. W. H. Atkinson being requested to explain his mode of treating pulps, said:

Successfully to treat complicated cases of exposed pulps, we must proceed as in fractions, and reduce them to their lowest denominations. To do this, when a pulp is exposed and aching, remove all extraneous matter from contact with the exposed point; if this be not sufficient to arrest the pain, after drying by lightly applying shreds of bibulous paper until all excess of moisture is removed, apply pure creasote; preventing the influx of saliva or other moisture by a dry napkin held around the tooth for a few seconds, to afford the greatest facility of action of the creasote on the albuminoid structure. Should the pain continue, notwithstanding this application, remove the napkin and thoroughly syringe out the cavity with tepid water, washing out all uncombined creasote; apply a fresh napkin, and proceed to dry as before; then apply the best chloroform on a pledget of cotton.

Should this not succeed, repeat the former procedure, and apply tincture of aconite root, and "you will not have gone the round of the countries of this, our Israel, until Shiloh shall have come," or, in other words, the redemption to healthy status be complete. In the majority of instances the first procedure will be sufficient.

After thus having simplified the case, proceed to prepare the cavity in favorable form for the reception of the filling. Once more apply the napkin or sheet rubber, or both, to keep dry, and then most delicately apply rumpled fragments of bibulous paper until all moisture is removed; then place a drop of pure creasote on the point of exposure; after which apply a soft mass of osteo-plastic directly upon the pool of creasote, touching it lightly to cause it to spread over the newly-formed membrane or pellicle at the point of exposure, and push the creasote in a wave over the whole exposed surface of pulp and cut ends of dentinal

tubes, thus preventing the solution of tincture in hydrochloric acid from entering the tubes and causing shock or pain.

Wait for the osteo-plastic to firmly set; then remove all excess beyond the desired quantity for non-conducting cap or protection to the pulp, and proceed to fill with as much confidence as if the pulp had not been exposed. If, in addition to pain, pus be discharging at the point of exposure of the pulp, the only modification I would advise would be to complete the filling with osteo-plastic at the first sitting, and send the patient away properly instructed, awaiting the event. In these latter days we stand on vantage ground, for we have the light of past experience, as displayed in failures and success, to speak with trumpet tongue to all who have ears to hear the truth, and disposition to know for themselves the facts and philosophy involved in our daily responsibilities.

Fully to elucidate the reasons why we need fear no evil from the course advised, demands so much of preparation of teacher and learner, that we may despair of making ourselves clearly understood by all short of an earnest lifetime of anxious, active toil, to understand and to propound the process and principle involved in living organic being or bodies. But that we may begin at the beginning, let us state of what the osteo-plastic is composed, that we may the better apprehend its probable action upon the more complicated structures of the animal economy.

Osteo-plastic is a due admixture of oxide of zinc and hydrochlorate or muriate of zinc. Oxide of zinc consists of one equivalent of zinc, 32·3, and one equivalent of oxygen, $8 = 40{\cdot}3$.

When the mixture is accurate as to equivalency of the powder and fluid, there will be no excess of the hydrochlorate; this substance holding such strong affinity for the albuminoid contents of the tubules and pulp, its action upon which has been the cause of pain whenever pain has supervened upon its application, and the proof that it was in excess. Here, as everywhere throughout the processes in organized bodies, we perceive the display of sun-presence and earth-presence, or affinities. Not to enter too deeply into the ontological aspect of this question of affinities, suffice it to say that chlorine is the first-born to oxygen by a combination with earth-presence—oxygen itself resulting from its hypothetical radicals in ozone; thus, ozone plus (O +) and ozone minus (O —) equals oxygen (O). The oxygen is the immediate purveyor of sun-presence, and consequently the organizer and principal disorganizer throughout the entire range of the mineral, vegetable, and animal kingdoms.

Thus much to enable us to apprehend how these favorable results are brought about by the course advised. Let us review the process and try to understand it. We first remove all irritating substances, and

then apply a grandchild of oxygen, viz., creasote, C,H,O, which marries its second cousin, the albumen, C,H,N,O, of the tissues, thus securing good neighborhood of feeling in the disturbed territory; and now to build a house that they may in harmony abide, we bring in an Ishmaelite (the osteo-plastic), to hedge in and protect these thin-skinned people from too near contact with the outside barbarian or stranger (gold), with which we complete the outer wall, and thus prevent the shock that would result were the gold placed in immediate contact with the tissues.

Taking it for granted that it is understood what this affinity subsisting between the hydrochlorate and the mucous mass of the tissues is, let us recapitulate, and amplify somewhat upon its display in this particular case:

1st. The hydrochlorate of zinc is a powerful astringent, acting upon the connective tissue in nerves and blood-vessels, reducing their calibre; in the case of the nerves coagulating the albuminoid parts, and in the case of the capillaries contracting the calibre from the point of contact toward the arterioles and venoils, displacing all the red blood and the more fluid portions of the liquor sanguinis.

2d. In doing this, the albuminoid contents of the cells and the free juices of the flesh are acted on in a like manner, producing a colloid mass with varying degrees of density according to the quantity of chlorate present. In the lesser equivalency, where the cells and vessels are not obliterated, conversion into secondary dentine may be hoped for. In case of the greater equivalency necessary to the conversion of the entire structure into an amorphous colloid mass interfering with rapid calcification, the process is retarded for a greater length of time; but in most cases will ultimately become hardened by deposit of lime-salts, rendering the tooth permanently useful.

EDITORIAL.

LACERATING THE MUCOUS MEMBRANE.

Patients are sometimes subjected to great inconvenience, if not actual suffering, by the heedless manner in which careless operators remove napkins or pieces of muslin from the mouth, which have been placed there for the purpose of keeping the teeth operated upon free from the flow of saliva. The buccal secretions, salivary, and mucous, however, occasionally are so limited, that the materials employed to absorb them not only do it in the most effectual manner, but, in addition, become so firmly attached to the mucous membrane of the gums and cheek, that if care is not exercised the mucous membrane will be torn away in the effort to remove them. Instances such as these we find unfortunately have too often occurred. The slightest precaution,

however, obviates the possibility of such results. The dryness of the material employed of course induces the close union between it and the mucous membrane; by injecting water on the cloth, it becomes saturated, the attachment ceases immediately, and the napkin can be removed without the slightest trouble. This suggestion may be regarded of little moment by some readers, but patients who have suffered from rude handling in this direction will appreciate its value. J. H McQ.

THE VULCANITE QUESTION.

A NUMBER of letters—too numerous to be answered individually without interfering with pressing duties—have been received from correspondents in various sections of the country, asking what they shall do with respect to the Hard Rubber Company, as the agents have called upon them and insist, in the most peremptory manner, upon immediate settlement. Some of the parties state that they had made former settlements with the company, but that the terms now proposed are so outrageous that they are past endurance. In response to each and all of these letters, I would say, when the agent calls, treat him civilly, but be entirely non-committal; afford him no information; make the interview as brief as possible, the shorter the better; and if he pertinaciously insists that he has a right to ask questions, let him know that you have an equal right to decline to answer them; above all, don't become alarmed or excited if he asks your name in full, writes it down in a book, and talks about commencing a suit at once, for this is done to intimidate the weak ones. The validity of the patent cannot be regarded as definitely settled, let the agents say what they may to the contrary, and in New York, according to the statement of a correspondent in another part of the magazine, the matter is again to be contested by a member of the profession. J. H. McQ.

OBITUARY.

DR. JACOB GILLIAMS.

IN the fullness of time, at the advanced age of 85 years, and after an extended career of usefulness, DR. JACOB GILLIAMS, the oldest member of the profession in the United States, if not in the world, died at his late residence, in Philadelphia, on Tuesday evening, February 4, 1868, retaining up to the latest moment of existence possession of all his faculties. Although but little known to the present generation of dentists outside of his native city, his name is prominently and indissolubly associated with the foundation of one of the most important scientific institutions in the country—the ACADEMY OF NATURAL SCIENCES OF

PHILADELPHIA. The idea of establishing a society for cultivating an acquaintance with natural science having originated with the late Mr. John Speakman and Dr. Gilliams, the latter, with a spirit of liberality highly to be commended, erected, a short time after, entirely at his own expense, a hall for the accommodation of the museum, and as a place of meeting for the members of the society, which was used for a number of years, and until the growing proportions of the organization demanded a larger building. Although not a contributor to any department, the interest which he felt in the natural sciences brought him in intimate relations with a number of prominent men, who have contributed largely to the natural history of America. Well do we remember the pleasure with which our old friend used to refer to the early struggles of the infant society, and the natural and commendable pride he felt in having been instrumental in founding an institution, whose museum and library afford such valuable facilities to students of nature, and whose sphere of usefulness in the future will be greatly enhanced by the recent and munificent endowment of 120,000 dollars (on the part of some of our wealthy and liberal citizens) for the purpose of erecting a building capable of properly exhibiting the extensive and valuable collection of specimens, and with lecture-rooms attached, where the various departments of natural science may be presented to the public in an interesting and instructive manner by competent lecturers.

Dr. Gilliams succeeded to the practice of his father, and was engaged in the active duties of the profession for a remarkably long period, in all half a century, during which he enjoyed a remunerative practice, and commanded the respect and confidence of his patients and fellow-practitioners. Although not a contributor to its literature, or taking a very active part in the movements of the profession, he always felt, and expressed in private intercourse, a deep interest in its advancement. He participated in the establishment of the ODONTOGRAPHIC SOCIETY OF PENNSYLVANIA, and served as the first president of the society. Possessing a large fund of information, obtained as a student of nature, of men and of books, combined with a warm, genial, sympathetic nature, his company always proved agreeable and instructive, and was sought after by men of cultivated tastes and liberal attainments. Measuring over six feet in height, and symmetrically proportioned, with hair and beard as white as the driven snow, his appearance was an impressive one, and indicative of hale old age, and one of the best pictures, from the studio of his friend, Mr. Rothermel, the historical painter, is a portrait of him painted some years ago, and intended for the ACADEMY OF NATURAL SCIENCES. Having passed a useful life, which was extended far beyond the span allotted to man, he has gone to his resting-place, leaving behind him pleasing associations in the memories of his family and friends.

J. H. McQ.

BIBLIOGRAPHICAL.

THE DENTAL REVIEW. Edited by ROBERT T. HULME, M.R.C.S. November, 1867. London.

It is much to be regretted that this magazine, after an existence of ten years, during which it has rendered valuable service to the dental profession in England, particularly as the able exponent and advocate of the College of Dentists, has been compelled, like the institution whose cause it so faithfully supported, to close its career. The editor says: "Having failed to receive a sufficient amount of literary support to justify him in continuing the journal, it terminates with the present number, after an existence, dating from its commencement in 1857, of ten years. The editor trusts that in other and abler hands, the dental literature of this country may be more worthily represented than it can claim to be at present."

An able article, descriptive of "TWO CASES OF IRREGULAR DEVELOPMENT OF THE WISDOM TEETH," by the editor, along with a number of selected articles, reviews, bibliographical notices, and abstracts of two papers read before the ODONTOLOGICAL SOCIETY OF GREAT BRITAIN, one by SPENCER BATE, the other by PROF. OWEN, F.R.S., constitute the table of contents of this number; which as usual present a highly creditable appearance, on account of the unexceptionable character of the typography, paper, etc.

The editor comments at some length upon the discussion, in this country, relative to the interglobular spaces, and closes his notice as follows:

"With regard to the nature of the interglobular spaces and their relation to the dentine globules, Mr. Salter makes the following remarks:

"'I would here remark,' he says, 'that the interglobular spaces (as ordinarily observed in teeth extracted, allowed to get dry and subsequently cut into sections) are truly hollow and filled with air. The relation which the dentinal tubes have to the dentine globules and the interglobular spaces is interesting and remarkable. The globules are permeated by tubes exactly as the other dentine; the face of a large globule sometimes exhibits as many as five or six tubes traversing it. Now, in following an individual tube across a mass of globules, one observes it follow a regular course, just as if there were no interspaces: one follows the tube across one globule, then skipping the interspace, one finds it crossing the next globule in a line with its position in the first, and so on. There seems an evident continuity. In specimens in which the interglobular spaces have been filled with Canada balsam I have seen (as I have believed) the dentinal tubes collapsed upon the sides of the interspace establishing the continuity. Kolliker has seen more than this; for he says, that in decalcified specimens the interglobular spaces are sometimes filled with a soft substance, which is traversed by tubes and "these may be entirely isolated like the dentinal tubes." Though I have looked for these I have not seen them, but of the fact I

cannot doubt when stated by such an authority, especially as I have observed what amounts to the same in a different phase.' * *

"'But the most instructive specimens are to be obtained from the very thin cap of dentine found upon the fœtal pulp. The thin edge should be cut off and examined on the inner surface; it should be moist and never allowed to get dry. In such specimens the globules are very apparent, but, as Czermak observes, they do not appear superficial but in the substance of the dentine. This he has not explained, but I have observed that, by gradually depressing the focus of the microscope, the first object that meets the eye is the ends of the columnar pulp-cells adherent to the surface of the dentine. As the focus is carried deeper these appear more or less fused together, and more remotely the dentine assumes a consistent and definite structure. It is here in the moist specimens that the focus reaches the globules, and, consequently, there is no superficial stalactite-like bulgings of globules: it is only in dry specimens that that is seen. *Now, if such a specimen be steeped in dilute muriatic acid so as to remove all the earthy materials, the globules instantly vanish, and the dentine, where they were seen, assumes the same aspect as that where they were not seen. No other change is produced.* The existence of the globules, therefore, seems dependent upon the presence of earthy material. This suggested to Czermak the idea that the organic material of dentine is, during the calcifying process, impregnated with earthy salts in globular forms, and that, by a deeper degree of calcific impregnation, the whole tissue is imbued with the hardening element, and the globules are fused. Such a doctrine is capable of explaining all the circumstances of the case; and we have only to imagine an arrest of calcification at the globular stage, over the surface of the pulp as it exists at any one time, to explain all the phenomena of the contour markings' * * * * *

"'Now, the idea that the contour markings are produced by an imperfect supply of calcareous material is consistent with the collateral circumstances. Upon that idea one would imagine that other tissues besides dentine, dependent for their maturation on lime impregnation and the other teeth, would suffer at the same time; that is, believing the effect to be produced by a general vice of nutrition, and such, indeed, is the fact. The enamel almost always suffers at the precise spot where the globular patch abuts upon the surface, rendering it irregular and rocky, and it will constantly be found that these appearances are observable on many teeth of the same individual; not at the same spot on all the teeth, but at places corresponding with the different degrees of development which the various teeth would have attained at one particular period. Why the dentine should be thus aborted, so to speak, at successive periods of its growth, and why during intermediate intervals it should mature perfectly, are questions which can only be explained by imaginary successive periodic conditions of depressed and healthy nutrition in the individual during the formation of such teeth.'

"Such is the knowledge we have long possessed of the nature and physiology of globular dentine, and although the additional authority of Czermak and Salter may not be sufficient to convince those who, only pursuing such investigations on some special occasion, are either unable to see or else to interpret the evidence afforded by the microscope, yet it may serve to corroborate Dr. McQuillen's statement of facts which have long since been recognized and accepted by some of the best microscopists of the Old World."

PERISCOPE OF MEDICAL AND GENERAL SCIENCE IN THEIR RELATIONS TO DENTISTRY.

BY GEO. J. ZIEGLER, M.D.

"*On the Identity of Physical with so-called Vital Forces.* By Dr. Letheby.—The fiction of an Archæus and the mechanical and chemical theories of life have given place to the dogma of a vital force; but the recent progress of physical science has done much to dissipate our illusions concerning fictitious entities and mysterious forces. The study of physical phenomena, from a dynamical point of view, has led to the recognition of the fact that there is a definite correlation or mutual dependence of physical forces—'that the various imponderable agencies, or the affections of matter, which constitute the main objects of experimental physics, namely, heat, light, electricity, magnetism, chemical affinity, and motion, are all correlated, or have a reciprocal dependence; that neither, taken abstractedly, can be said to be the essential or proximate cause of the other, but that either may, as a force, produce or be convertible into the other; thus heat may mediately, or immediately, produce electricity, electricity may produce heat, and so of the rest.' 'I believe,' says Mr. Grove, from whom I am quoting, 'that the same principles and mode of reasoning might be applied to the organic as well as the inorganic world, and that muscular force, animal and vegetable heat, etc. might, and at some time will, be shown to have similar definite correlations.' This was said almost a quarter of a century ago, and yet we are only just beginning to recognize the truthfulness of his hypothesis. A former teacher in this school, Dr. Carpenter, whose large acquaintance with physiology and physics especially qualify him for a searching examination of this subject, has fully confirmed the views of Mr. Grove. He has established the fact that there is not only a mutual relation between the so-called vital forces, which are concerned in the growth, multiplication, and transformation of tissues, in secretion, in muscular and other organic motion, and in nervous action, but that there is also a like relation between vital and physical forces. Believing with Mr. Grove that all these forces are but different modes of action of one and the same agency, he contends that the differences of action are due to the material substratum or medium through which it acts; 'that, operating through inorganic matter, it manifests itself in electricity, magnetism, light, heat, chemical affinity, and mechanical motion; but that when directed through organized structures, it effects the operation of growth, development, chemico-vital transformations, and the like; and is further metamorphosed through the instrumentality of the structures thus generated, into nervous energy and muscular power.' So that it is the specialty of the material substratum, thus furnishing the medium or instrument of the conversion or metamorphism of force, that marks the differences between physical and vital phenomena. I believe that the time is fast approaching when all special entities for the explanation of physical and physiological phenomena will be dispensed with, when the fundamental conceptions of matter and motion will be found sufficient for their explanation.

"In the case before us, it is not necessary to suppose that a living

cell or primordial germ contains within itself, in a latent form, the whole organizing force which is required to build up the future plant or animal. Nor is it necessary to believe that vital force exists in a dormant condition in all matter that is capable of being organized, and that the living cell, in growing and multiplying, evokes and utilizes it. It is enough that the cell is the medium for the conversion or metamorphosis of external physical forces into what are called vital actions.

"The external force which the cell chiefly converts is heat; and Dr. Carpenter lays so much stress on the dependence of the organizing forces of both plants and animals, on the continual agency of heat, that he regards their vital action as the correlation of it. It might, indeed, almost be said that the special and distinctive attribute of a living organization is the power of converting heat into vital force. In plants it is entirely exercised in the growth and transformation of tissue; but in animals it is also rendered subservient to the production of nervous and muscular forces; and these manifestations of action are always exhibited in tissues, which retain their original cellular constitution. It is remarkable, too, that no cell has the power of performing two different operations at the same time: thus, says Dr. Carpenter, the *assimilating cells*, whose function it is to convert the raw material supplied by food into organizable *plasma*, exercise little or no chemical transformations; they do not undergo change of form; they do not exert any mechanical or nervous power, and they do not reproduce their kind. So, again, the cells which are specially endowed with the powers of *multiplication*, as well as those that are engaged in *reproduction*, have in each case no other vital endowment. It is the same with the *secreting* cells, and with the cells that are concerned in the production of *mechanical movement*, as the contractile cells of muscular fibrillæ, the ciliated cells of respiratory and other passages. Perhaps, also, it is the same with the cells, or cell-nuclei of the *ganglia*, and extremities of nerves which in all probability are the agents of *nerve-force*. This faculty of exercising but one function at a time is a marked peculiarity of physical forces. If, for example, the force derived from chemical action in a galvanic battery be made to act on a fine platinum wire, it will show itself as *heat;* or if it be conducted through a coil of wire placed around a piece of iron, it will exhibit itself as *magnetism;* or if it be conveyed through acidulated water, it will appear as *chemical action;* but all these manifestations of it cannot be fully exerted at the same time. There is, consequently, a certain quantivalence of action; in fact, the idea of the correlation and mutual dependence of forces, involves the necessity of a certain definite ratio or equivalence of action; for as force cannot be created or destroyed, it must ever be acting in some fixed proportion. If, therefore, the heat and light force received by the plant be converted into vital force during the growth and transformation of tissue, there must be a quantivalence of action, and the force must endure. While the cell lives it is exerted in the manifestations of vital phenomena, but when it dies and decays it is converted into chemical action, and then into heat and sometimes light. In the case of the plant the transformation of heat force is chiefly concerned in the production of tissue; and so also in the animal during the processes of growth and repair; but when the latter engages in the main duties of its existence, the development of motion, it resorts to the affinities of its food, and as these are the embodiments, so to speak, of the light and heat, through whose agency they

formed, it may be said that the functions of the animal body are performed through the agency of cosmical force. The plant is the machine or medium whereby light and heat are converted into the force which forms tissue, and the animal is the machine or medium for changing the affinities of the tissue into other manifestations of force, and finally into heat. The one is accompanied by processes of deoxidation, and the building up of compounds; the other by processes of oxidation and pulling down, but throughout the whole of these changes there is the same force operating through different media.

"It follows from this, that there must be some definite relation between food and animal force. Hitherto it has generally been thought that the nitrogenous element of food is the exponent of its value, and that there is a direct relation between the waste of muscular tissue and the amount of work performed. Attempts have, therefore, been made to estimate the relation by observing the amount of nitrogen excreted, as urea, during exercise of different degrees of activity. The results, however, have shown that, under the best circumstances, the actual work performed exceeds that produced by the oxidation of the nitrogenous constituents of the food and worn-out muscle by more than thirty per cent., and in some experiments, which were made in 1866, by Drs. Fick and Wislicenus, of Zurich, when they ascended the Foulhorn, which is 2000 feet above the Lake of Brienz, in Switzerland, it was ascertained that the amount of work done in climbing the mountain, exceeded by more than three-fourths that which it would have been theoretically possible to realize from the oxidation of muscle, as indicated by the quantity of urea in the urine. Consequently they conclude that muscular force is chiefly, if not entirely, derived from the carbo-hydrogen of our food, and that the muscle is no more than the machine for the production of motion. Like a steam-engine, it converts the affinities of the oxidized fuel into heat, and then into visible motion. Like it, also, its movements must cause decay and necessitate repair. The nitrogenous constituents of our food are chiefly concerned in this last process, and it is very doubtful whether as much force is not expended in this process, as is afterwards produced by the oxidation of the worn-out tissues. In the consideration of this subject, however, we must not lose sight of the fact that there is a difference between sustained and temporary muscular activity. The herbivora, as the horse, the chamois, the stag, etc., are capable of great temporary exertion, but they are not equal to the carnivora for sustained energy; and with our own domestic animals, we find that they are capable of performing most work when they are supplied with vegetable food containing much nitrogen.

"Lastly, I will remark, in illustration of the general tendency of physiological pursuits, that great efforts are being made to determine the constitution as well as the composition of the fluids and tissues of the living body; for there has long been a desire to understand the way in which the common affinities of matter are controlled by the living cell. Broadly, the chemist has ascertained that the chemical functions of the plant are those of reduction or de-oxidation, whereby carbonic acid and water lose oxygen, the residual elements with the nitrogen of ammonia forming tissues. The functions of an animal, as I have said, are of an opposite nature, for instead of building up they pull down; and in using the tissues of plants as food they oxidize them, and finally restore them to nature as carbonic acid, water, and ammonia. 'The two extremes

of these changes are,' to use the words of Gerhardt, 'carbonic acid, water, and ammonia, at one end; albumen, gelatine, fat, and cerebral matter at the other;" but the transitions to these extremes are countless, and are as yet almost beyond the ken of science. Who can tell us by what series of transformations the carbonic acid and water, received by the plant, are converted into vegetable acids, sugar, and fat? And still more mysterious are the phenomena which accompany the formation of tissues. Why is it that a living cell, as we call it, possesses the power of transforming cosmical forces, light and heat, into cell-force; and in aggregating matter, how is it that it keeps common affinities at bay? That when it dies, as we express it, the matter so aggregated during life, decays, and comes again within the reach of ordinary affinities? What answer can we give to these questions? No other than that organic matter is the designed or appointed medium of these changes; and we can no more explain the phenomena than we can say why it is that mineral matters are the appointed media of other manifestations, as light, heat, magnetism, and electricity. Such questions are beyond the scope of the human intellect, and mark the limit of our understanding.

"Apart from these questions, however, the chemist has hope that he will penetrate the mystery of organic changes, in so far as the chemical combinations are concerned. Already he has found the clew to many of the vegetable processes of reduction, and has been able to produce a large number of organic compounds from carbonic acid, water, and ammonia, and even from the elements themselves; in fact, of the three great classes of alimentary substances, as Dr. Odling says, the production of the oleaginous is quite within his reach; the saccharine is almost within it; but the albuminous is still far beyond it. He has thus proved that the dogma of a vital force, which has tyrannized so long over men's minds, has no foundation; for a host of organic compounds can be made artificially.

"And then, with regard to the processes of oxidation, which characterize the functions of animals, he has been able to imitate them to a much larger extent; for, by subjecting organic compounds to chemical transformations, he has produced a multitude of secondary products like those of the living world; recognizing the fact that all secondary products of tissue-transformation are compounds of comparatively simple molecules, from which the elements of water have been eliminated—in other words, that they are composed of the residues of other molecules—the chemist has been able, not only to classify them into certain definite groups, but he has also been able to construct them after the fashion of organic nature. *Stearin* has been produced by joining the residues of glycerin and a fatty acid. *Sarcosine*, which is a muscle-product, by putting together the residues of acetic acid and methylamine. *Hippuric acid*, from the residues of benzoic acid and glycosine. *Taurine*, which is a constituent of bile, from the residues of isethionic acid and ammonia. *Urea*, from the residues of carbonic acid and ammonia; and so of many others.

"In this way 'organic chemistry has achieved,' as Dr. Odling truly observes, 'a great *analytical* success. The compounds so elaborately built up by the living organism, it has pulled to pieces, and the pieces themselves it has arranged into natural series and groups of associated bodies.' It has also effected *synthetical* processes, and has built up organic compounds from mineral elements; and its hopes are that the

entire processes of organic nature, short of making tissue, will ere long be seen and imitated. Presumptuous man! it may be thought, are you not striving for the impossible? In these explorations of vital phenomena are you not trespassing upon holy ground? Can the finite measure the depths of the infinite? Already we have done so. 'The being of a day has pierced backward into primeval time, deciphering its subterranean monuments, and inditing its chronicle of countless ages. In the rugged court and shattered pavement of our globe, he has detected those gigantic forces by which our seas and continents have changed places; by which our mountain ranges have emerged from the bed of the ocean; by which the gold and silver, the coal and the iron, and the lime, have been thrown into the hands of man as materials of civilization, and by which mighty cycles of animal and vegetable life have been embalmed and intombed.' 'He has ascended the Empyrean, and by steps of physical research, has reached the visible boundaries of the universe, and has scanned with eagle eye the mighty creations in the bosom of space. He has marched intellectually over the mosaics of sidereal systems, and has followed the adventurous Phæton in a chariot which cannot be overturned.' 'Ideas, like these, when first presented to a mind thirsting for knowledge, are apt,' says Sir David Brewster, from whom I am quoting, 'to disturb its equilibrium and unsettle its convictions. Should this be the mental condition of any one of you, be not alarmed for its results, for this species of skepticism is the infant condition of the uncurbed and generous intellect. There can be no convictions where there have been no perplexities and doubts; and that faith which comes in the train of early skepticism will finally rest upon an immovable foundation.'

"Credulity, on the contrary, is a disease of feeble intellects and ill-regulated minds. Believing everything, and investigating nothing, the mind accumulates errors, till its overgrown faith o'ermasters its untutored reason. Such a facility of belief may in some cases claim the sympathy even of philosophy; but when it spurns the strict demands of inductive truth, and plants imagination at the door of the temple of science, it cannot be too severely reprobated, or too sternly shunned."—(*Chemical News.*)

Correlation of Mental and Physical Force.—"In a lecture at the Royal Institution, PROFESSOR BAIN attempted to show the possibility of bringing mental force into correlation with the physical forces. Commencing with a brief exposition of the theory of correlation, he at once admitted vital force as a member of the group, which he proceeded to classify into molar or mechanical force, molecular force (heat, light, electricity, magnetism, and chemical affinity), vital force, of which nerve force may be taken as the type.

"The laws which govern the correlation of the first two groups are easily reducible to exact numerical representation. Thus the mechanical equivalent of heat may be expressed in so many foot pounds, and from a knowledge of this law we may say that the complete combustion of one pound of carbon would produce sufficient force to raise an ordinary man to the highest peak of the Andes. Passing, then, to the lower forms of vital force, we find that as much heat is absorbed during the growth of plants, during the deposit of carbon in their tissues, as is evolved on combustion of the same; while, during the life of animals, the mechanical and nervous energy displayed is derived from the com-

bustion of the food, which is, primarily at least, of a vegetable nature; and there can be no doubt, that if we could exactly measure the products of this combustion, we should be able to represent the amount of force produced by a mechanical equivalent Mental force is to be considered as the noblest representative of nerve force in its highest development, and it is therefore subject to the same laws. * * *

"The chief organ through which mind acts on body is the brain, consisting as it does of an infinitely complex web of nerve-fibres, and subject to the ordinary laws of development, nutrition, and degeneration; action is accompanied by waste, waste necessitates renewal; and so, within certain limits, by increasing the amount of the richness of the nutriment supplied, we are able to increase the nervous power; while if an undue proportion of nourishment has been required to replace the waste produced by mental exertion, we find the general *physique* below par. If, then, mental phenomena be proportional to physical supports, a numerical relation must exist between the intensity of a sensation and the nervous waste produced thereby; in other words, a sensational equivalent may be obtained. Physicists and physiologists have hitherto declined to assign even an approximate value to this equivalent; they object to the uncertainty attending the rise and fall of mental activity, and to the want of a standard by which mental force may be measured. The problem is doubtless a difficult one, but probably not an impossible one; considering the attendant physiological waste as the index of the intensity of the activity, it only remains necessary to classify and define mental phenomena with sufficient care to enable them to be recognized and ticketed with their exact value.

"Although severe intellectual labor is incompatible with bodily exertion, and although we find, as a rule, that men of a highly developed *physique* rarely display the highest mental qualities, yet much may be done by a careful and judicious expenditure of the available force, and by the employment of means to attain any required end with as little loss as possible. Here it is that the educated man has the advantage over the uneducated, even in the performance of those labors or sports which might be considered the undoubted province of the latter. In all cases, however, in which mental and bodily exertion take place simultaneously, the total waste of the system will be proportionately high, and an increase in the quantity or quality of the nourishment supplied must be forthcoming to prevent the individual from suffering degeneration.

"The correlation of the mental with the physical forces is then so far proved, that the production of mental phenomena is accompanied by a loss of force in the animal economy, and that this loss must be replaced by a further supply of force obtained in the form of food capable of assimilation and of subsequent oxidation."—(*Med. Times and Gaz.* and *Med. News.*)

Alleged Production of Insanity by Etherization.—In a notice of the report of the Boston Lunatic Hospital (*Amer. Journ. Med. Sci.*) it is stated that DR. WALKER treats as follows of this subject: "In regard to the use of ether in dental surgery, we can only repeat what has been said before. In many cases treated here, and even elsewhere, in which the inhalation of ether was alleged to be the cause of the disease, it has been found, on careful inquiry, that it had no agency whatever in inducing the existing trouble. In many instances, after the admission of the patient,

ether has been administered daily, and even three and four times a day, for weeks in succession, to subdue excitement, or to induce sleep—in most cases with the happiest results, and in no one case with disadvantage. In many instances life has been prolonged and saved by its use. All the cases in which it is said to have been injurious were females, and the history of one would answer for all. The general health had been failing for a long time, and depression of spirits and disinclination to exertion of any kind had become characteristic. Troubled with decaying teeth, under the influence of ether from eight to twenty were extracted at a single sitting. From that hour what was, in the estimation of friends, a mere negative condition, became positive and active, and deep depression, with suicidal tendencies, or excitement with destructive propensities, took the place of listlessness and debility. Remembering how the muscular and robust man will droop and die under a capital operation, what wonder is it that a delicate and nervous woman, exhausted by disease, and worn by loss of food and sleep, finds in the shock of such an operation, the last atom that renders the burden insupportable, and breaks down the last support of self-control."

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"*Results which follow the Section of Nerve-trunks, as observed in Surgical Practice.* By JONATHAN HUTCHINSON.—These observations are intended to show the results which follow division of the nerves, as regards the nutrition of the part affected, and the maintenance of animal heat. Next to loss of sensation, the chief result of section of a nerve is a diminution of temperature, and another result is inflammation, which, however, Mr. Hutchinson thinks is rather *permitted* than *caused* by the state of nutrition induced by the section. None of Mr. Hutchinson's cases lend any material support to the commonly received opinion that nerve-trunks when cut are rapidly repaired."—(*Brit. and For. Med.-Chir. Review.*)

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Chronology of Anæsthesia.—A correspondent of the *Lancet* gives the "following as the chronological history of painless surgical operations during the anæsthetic state, induced by the inhalation of narcotic and stimulating vapors:

"The first surgical operation during an anæsthetic condition, induced by the inhalation of the fumes from rum, was the reduction of a dislocation of the hip-joint of a negro, 'Bob.' Louisiana. By Dr. Collyer. December, 1839.

"Extraction of tooth from Miss Mary Allen during an insensible condition, induced by the inhalation of ether combined with the fumes from poppy-seeds. Philadelphia. By Dr. Collyer. November, 1842.

"Publication of 'Psycography' (copyrighted work), wherein at pages 26, 27, and 28, particular mention is made that the inhalation of narcotic and stimulating vapors will produce the anæsthetic state. Philadelphia. By Dr. Collyer. May, 1843.

"Insensibility produced by the inhalation of protoxide of nitrogen. Hartford, Connecticut. Horace Wells. 1845.

"Publication in *Boston Medical Journal*, that ether combined with opium would produce the anæsthetic state. Boston. By Dr. Smilie. June, 1846.

"Administration of ether by Drs. Morton and Jackson. Boston, United States. September, 1846.

"Inhalation of chloroform. Edinburgh. By Dr. Simpson. 1854. (1847?—Z.)

"Amylene. London. By Dr. Snow. 1857.

"Bichloride of methylene. London. By Dr. Richardson. 1867."

Bichloride of Methylene.—"The following are DR. B. W. RICHARDSON's general conclusions in regard to the bichloride of methylene:

"'1. It is an effective general anæsthetic, producing as deep insensibility as chloroform.

"'2. In action it is rather more rapid than chloroform, but to develop effects more of it is required, in the proportion of six parts to four.

"'3. It produces a less prolonged second degree of narcotism than other anæsthetics.

"'4. When its effects are fully developed, the narcotism is very prolonged, and is reproduced with great ease.

"'5. Its influence on the nervous centres is uniform, and it creates little, if any, disturbance or break of action between the respirating and circulating functions,

"'6. Its final escape from the organism is rapid, so that the symptoms of recovery are sudden.

"'7. In some cases it produces vomiting.

"'8. When it kills it destroys by equally paralyzing the respirating and circulating mechanisms.

"'9. It interferes less with the muscular irritability than perhaps any other anæsthetic.

"'10. It combines with ether and with chloroform in all proportions.'"—(*Med. Times and Gaz.* and *Amer. Jour. Med. Sci.*)

"*Local Application of Anæsthetics.* By DR. P. H. WEVER —It is the object of this communication to mention a method of using chloroform, ether, or chloric ether, that occurred to me some years ago, and that is the application of either of the above agents in the neighborhood of painful parts, as well as to the parts themselves The above plan is original with me, and was adopted with decided success during a country practice of several years. At my suggestion it has been tried by a respectable dentist of our place, Hillsborough, Ohio, in the extraction of teeth, and is most decidedly approved of by him. The plan is to drop on the vertex from ten to thirty drops; cover directly with a folded handkerchief, and, during the anæsthetic effect, the tooth can be drawn. Should the chloroform or ether cause a painful sense of heat, the cloth can be partially or wholly removed."—(*Cincinnati Lancet and Obs.*)

"*On the Cure of Cleft Palate by Operation in Children, with a Description of an Instrument for facilitating the Operation.* By THOS. SMITH, F.R.C.S., Assistant Surgeon to St. Bartholomew's and the Children's Hospitals.—The author's object in presenting this paper, is to communicate to the Royal Medical and Chirurgical Society a plan of operating on clefts of the palate, applicable to all who suffer from the deformity, but especially to children, to those deficient in physical courage and in the power of enduring pain. No attempt is made to improve on the principles of staphyloraphy as laid down by Sir William Fergusson, though slight and inconsiderable modifications in that gentleman's practice are advocated, as more suited to the tender age of the patients, for whom the plan in question is specially designed. The

chief novelty in this proceeding is that chloroform can be employed. A painless and speedy operation can therefore be performed, and that with more precision and a greater prospect of success than when the operator is dependent upon the self-control of the patient; while, from the painless nature of the operation, the cure of cleft palate can be effected in children, to whom formerly the benefits of staphyloraphy were virtually denied. The author discusses the probable advantages of the performance of the operation in early life, though he waits for a larger experience to fix the particular age at which it is best to attempt to cure the deformity. The plan of operating recommended depends chiefly for its success on the employment of a gag, whereby the tongue is depressed, the jaws can be opened and fixed, and the orifice of the mouth enlarged. This is adjusted when the patient is under chloroform. The modifications of the ordinary operation as suited to the insensibility of the patient are described. They consist chiefly in avoiding any considerable flow of blood until the very last step in the operation has been accomplished. The author recommends for children the employment of fine fishing gut and horsehair as the best materials for suture, and describes certain modifications in the ordinary shape of the needles employed and the manner of passing the sutures, which simplify and expedite the operation. The conclusions in the paper were supported by cases. Finally, the author stated that he trusted, by the lapse of time and further experience, to be able to determine the age at which an operation should be done, and the effect of an early operation on articulation and vocal resonance. Appended to the paper were the accounts of eleven cases where the operation for cleft palate had been performed in the manner recommended by the author—that is, with the aid of a gag, and under chloroform. In eight of these cases the operation was successful; three were failures. No operation had been attempted on the hard palate, though in nine of the cases the deformity involved the bony palate to a greater or less degree. The author expressed a belief that it would in many instances be unnecessary to perform any operation on the bony palate if the cure of the soft parts were effected in early life. In support of this belief he adduced three cases of operation where the soft palate only had been united, and where the hole remaining in the roof of the mouth had gradually contracted to very small dimensions. Sufficient time had not elapsed since the operation in the author's cases to allow him to speak authoritatively on this subject. An easy method of fastening gut sutures without cutting the gut was described. Children were exhibited on whom the operation had been successfully performed, and one adult was also present, whose palate had been united by operation under chloroform. The author recommended the use of the gag and chloroform for adults as well as children in the performance of this operation. Though the effects of the operation in children on the powers of articulation had been at present highly satisfactory, the author abstained from making any definite statement on this subject, waiting rather for the lapse of time and additional experience to furnish fuller information.

"The president complimented Mr. Smith on the excellence of his paper. He remarked that Mr. Smith spoke of vomiting; he would ask if it were necessary to remove the gag to allow the child to get rid of the vomited matters.

"Mr. Smith explained that it was only necessary to do so that the mouth might be cleaned out.

"Mr. Durham said that although he had been at work on the subject for some time, Mr. Smith had completely taken the wind out of his sails. It was still questionable what was the exact period at which the operation could be earliest performed with a hope of success. No doubt, however, childhood was the great time. In fact, the improvements made in the manufacture of artificial palates rendered the operation in advanced life unadvisable, for it was only in children that much improvement in speech and swallowing was observed. The operation should be performed on patients when below fifteen years of age, and under the influence of chloroform, although this latter somewhat retarded the operation. As a ligature, he thought gut good, but the horsehairs had a tendency to unfold themselves. To facilitate their introduction he employed a needle-holder (which he showed), and found it a useful adjunct. Hitherto he had not used Mr. Smith's gag for any operation on the palate, but had found it most useful in dealing with the tonsils.

"Mr. T. Holmes stated that he had only once had an opportunity of operating in this way; that was in a boy of thirteen. He had proceeded much in the same way as Mr. Smith. He considered the gut likely to be an improvement To facilitate the operation, it was necessary to give a good deal of chloroform, so that the patient should be completely under its influence. The vomiting after the operation was often obstinate, and constituted one of the serious drawbacks on its success. In future he considered that chloroform would probably be used, as there was no danger with it, the bleeding not being troublesome. He did not attempt to deal with the hard palate.

"Mr. Startin remarked that silk, if covered with elastic collodion or gutta-percha, was quite as good as anything for ligatures.

"Mr. Prescott Hewett said that in removing the upper jaw, under chloroform, there was in one case of his, the operation being protracted, much hæmorrhage. The patient suddenly died, and it was found that the whole of the air-tubes were completely filled with blood. There were many cases now, however, which showed that the risk from hæmorrhage was not great as a rule.

"Mr. Curling said the hæmorrhage was usually slight, and the blood generally passed into the stomach.

"Mr. Clover said he had often given choloroform in dental cases where there was considerable hæmorrhage, and the blood always appeared to go down the throat into the stomach. The quantity and rapidity with which it was shed were, he believed, of importance. Under such circumstances he would use a nose-cap for the administration of chloroform. As a material for sutures, he would recommend a structure like the street telegraph—gutta-percha with a copper core. For this he would recommend a kind of needle, which he showed.

"Mr. Savory remarked on the great advance in practice this paper indicated. In Sir W. Fergusson's operation, the subsequent deficiency of articulation was disappointing. He had several cases, but had never seen complete recovery of speech; hence some think an artificial palate preferable. The question was—Would we get a better result now, operating so much earlier in life? It should be remembered that the opening was more than a mere fissure. A good deal of muscular tissue, especially of the levator palati, was absent, and the most we could do was to substitute a cicatrix for this deficiency. The hard palate, he said, might be left to itself, if the soft was closed. This he had seen

again and again. When the opening left was small, it was no impediment. The use of chloroform would depend on surgical opinion as to the best mode of dividing the muscles, whether it should be done from before or from behind.

"In reply, Mr. Smith said that the operation could be more readily performed with than without chloroform. For ligatures, nothing stiff could be used, as they irritated the tongue, and the child pulled them out. Horsehair he thought better than gut, as it did not soften. Vomiting was fatal to the success of the operation, and it occurred independently of chloroform. Mr. Savory's remarks were peculiarly true. The worst specimen of articulation he had ever heard was in one whose palate was entire. In one or two of his cases perfect speech was secured."—(*Lancet.*)

"*Treatment of Hare-lip.* By ALLEN DUKE.—Having read with considerable interest Mr. T. Smith's clinical paper on the treatment of hare-lip, and having considered every kind of suture recommended by him, and others to whom he alluded, with a view to prevent those ugly depressed scars and blemishes that almost invariably follow the introduction of pins and sutures of every kind *through* the skin, I cannot forbear drawing his attention to, and urging him to try, a method I have repeatedly adopted (several successful cases of which I published in the *Lancet* of March 20th, 1858), as being, I think, superior to every proceeding that has been recommended. It consists in passing two or more curved needles, armed with silk sutures, from the raw edges immediately *under* the skin, carrying them through the whole thickness of the lip, and tying them *inside.* The principal advantage of this plan is that they may be allowed to remain any length of time, till the parts are firmly united."—(*Ibid.*)

"*Ranula.*—Operation by Dr. Hamilton. P. R. Cortelyou, House Surgeon.

"Dec. 13th, 1867. R—, of N., aged 16 years, private patient, admitted to Bellevue under Dr. Hamilton's care.

"Soon after birth his father noticed a swelling under his chin near the median line, which has continued to increase ever since. Now the size of a large orange, nearly in the centre, but inclining a little to the right side. It is not painful or tender. Its surface is smooth and elastic. On exploration it was found to contain a thin yellowish fluid.

"Examining within the mouth, it was found to have lifted the tongue considerably, but its walls did not present the translucent appearance sometimes seen in ranula, nor could it be decided positively whether the orifices of the ducts, or the right side, were still open. It became a question what was the source of this enlargement or tumor.

"The true 'ranula' has been applied by some surgeons to obstructions of the sublingual ducts, by others to obstructions of the submaxillary ducts, and by most surgeons to obstructions of either the one or the other indifferently. Certain writers, also, have extended the term to all encysted tumors in this region, whether occurring in the areolar tissue or in muciparous glands, which present a common *external* appearance, like the throat of a frog.

"It was not very clear from which of these several sources this tumor had originated. It was decided, therefore, to proceed as if it were an

obstructed duct. Accordingly, Dr. Hamilton made a small incision into the tumor beside the tongue on the right side, avoiding carefully the ranine artery. This opening was at once enlarged by introducing a pair of bullet forceps and expanding them, so as to tear the wound larger. The sac was emptied, and a piece of laminaria digitata introduced. On the third day considerable inflammation existed, extending to the root of the tongue and side of the face. There had been, also, up to this time, a constant but slight hæmorrhage. Both the swelling and bleeding abated from this time. The contents of the sac were examined under the microscope, but not with sufficient care to determine their character.

"Feb. 1st, 1868, nearly two months after the operation, the father reports that the sac has almost disappeared. A little pus continues to discharge, and there is no tenderness or swelling. The laminaria is taken out daily and replaced with ease. It is probable that the complete cure will not take place under several months.

"Dr. Hamilton mentioned that a ranula was said to form occasionally in a bursa outside of the genio-hyoid muscle; but he had searched for this bursa and could not find it."—(*Medical Gazette.*)

"*Swelling of Submaxillary Gland, from Inflammatory Obstruction of its Duct.*—Charles D. Hoyt, of Middlesex, Yates County, called upon Dr. Hamilton, December 29th, 1846, with a moderate enlargement of the right submaxillary gland, it being apparently, as felt beneath the jaw, of the size of a large Lima bean. He stated that this enlargement occurred about one week before, while eating his breakfast, and that in five minutes it attained the size of a 'walnut with its bark on,' and that it prevented his opening his mouth freely. After leaving the table he rubbed it for some time, and in half an hour it was reduced to its present size.

"From that time the same enlargement occurred every time he ate, and without any reference to what he ate. It enlarged most, however, while eating his first meal in the morning. By rubbing alone could it be reduced. Chewing tobacco seemed rather to diminish than to increase its size. It was not tender, nor red, but when enlarged to its utmost it caused a severe pain, which extended to his ear.

"Tinct. of iodine externally was first employed by Dr. H., but no result being obtained, he directed him to take a full dose of Epsom salts. This had the desired effect. The enlargement disappeared very quickly, and did not return."—(*Ibid.*)

"*Obstruction of both Submaxillary Ducts.*—December 7th, 1847, John C. Lyons, aged 20, Benton Center, Yates County, consulted Dr. H. He stated that in the latter part of July, while harvesting, the weather being very warm, he discovered in the morning a soreness under his tongue upon the left side, and before night he found there was a tumor at this point. It was oblong and only about half an inch in length. His physician, Dr. Wolcott, opened it the following day, and it discharged a glairy matter. Since then it had been opened four times; but a few days before calling on Dr. H., he discovered that there was a swelling on the opposite side, externally, in the region of the submaxillary gland. When seen by Dr. H. the gland was of the size of a pullet's egg; oblong, not painful or tender. It was increasing in size, but

he noticed that it was larger in cold and damp weather. His health was good. He was advised to submit to a low diet, take physic, and apply externally the tinct. of iodine. He was never seen again, and the result is not known. During the winter of 1847 and '8, two similar cases of enlargement of the submaxillary gland were presented in Dr. Hamilton's surgical clinic, at the Buffalo Medical College, one of which had resulted in an external salivary fistula.

"In a recent report of one of Professor Jarjavay's clinics, copied into the number of the *Gazette des Hôpitaux* of November 23d, 1867, similar enlargements of the submaxillary gland are mentioned as occurring in connection with obstructions of Wharton's duct; but he restricts the application of the term ranula, to obstruction of some one of the twenty-eight or thirty excretory ducts of the sublingual gland."—(*Ibid.*)

"*Treatment of Dropsy of the Antrum, or Maxillary Sinus.* By DR. FANO.—Several operations have been proposed to evacuate the contents of the diseased antrum. The first impulse which occurs to one is to perforate the lower wall of the sinus with the trocar or the knife; but such an opening is so narrow that it closes rapidly. Hence the advice to make an opening with loss of substance, either on the anterior wall or some point of the alveolar border of the maxilla. Runge would excise a flap in the shape of a V; Boyer, a semilunar one, with the convexity turned downward. Even then the opening will close in the course of time, and the disease will recur. It is for such reason that to draw a tooth and perforate the socket up to the antrum is not the best method, unless the opening is prevented from contracting upon itself, by some foreign body. To that end we have, in a case, placed a silver canula, such as is used in the treatment of dacryocystitis; the canula is to fit the opening tightly; if it should become displaced, it would be well to fasten it to the neighboring teeth. In this manner we establish a maxillo-bucal fistula, permitting the free escape of the matter collected in the antrum, and allowing also the injection of any substance thought proper into the cavity. This is, though, but a palliative treatment. To obtain a permanent cure, it would be necessary to establish the normal opening of the antrum into the nasal fossa, or to make close by an artificial one; but it would then be necessary to place some foreign body in the opening to prevent its closing up, and that would be more inconvenient to the patient than a canula in the socket of a tooth. This canula should be removed if it is found that the natural opening of the sinus is re-established, which will be readily ascertained by injecting some colored liquid through the canula, and by inclining the head forward to see if it passes into the nasal fossa.

"The author reports a case of dropsy of the antrum to which he has applied the treatment spoken of above, and in which he says he has met with as satisfactory a result as could be wished for."—(*Union Médicale* and *New Orleans Journ. of Med.*)

"*Tobacco and Pickles.*—If Englishmen have had exaggerated ideas about the tendency towards rotundity exhibited by all Dutchmen, they have by no means overrated the national habit of smoking. The Dutchman of to-day is as great a smoker as was his great-great-grandfather. The pipe has, however, given way to the cigar; and the meanest laborer indulges himself, often when at work, with the 'weed,' which costs him

less than a farthing. Passengers on railways smoke as a matter of course; and the guard, as he passes from carriage to carriage to examine the tickets, does not hesitate to rest now and again in one of the carriages to smoke a cigar with any neighbor or acquaintance. The teeth of a Dutchman are nearly as characteristic as the skin of an Englishman who has lived for a long time in India; they are much discolored, and many of the incisors are carious. The Odontological Society will find the best specimens of discolored teeth from smoking among modern Dutchmen. The Dutchman's partiality for pickles is peculiar, yet easily explained. In Rotterdam, but more largely in Amsterdam, pickle-stalls are not much less frequent than apple-stalls in London. The pickle-stall seems to be, with many workmen, the half-way house between the work-shop and the dining-room. This nation of confirmed smokers abounds in dyspeptics; and the poorer classes give their clammed palates a fillip occasionally with the sour and acid substances sold in the streets."—(*Druggists' Circular.*)

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Fracture of the Lower Jaw.—In the course of some notes on the Paris hospitals, etc. (*Med. Times and Gaz.*), Mr. Jonathan Hutchinson observes that "a very important remark was made in reference to fracture of the lower jaw, by M. Gosselin. It is this—that when in fractures of the lower jaw the structures of the gum are broken through, the fracture is, in reality, a compound one, and the patient will have to run the risks of osteitis and pyæmia. I have often myself drawn attention to this, and it was with much pleasure that I heard its importance insisted on. M. Gosselin stated that whenever the gum was much torn up, inflammation of the bone, with suppuration and constitutional disturbance, was very likely to follow, and the patient from the 10th to the 14th not unfrequently became feverish and ill. In some cases, exfoliation of a fragment is safely accomplished, but others end fatally from purulent infection. He strongly deprecated interference with the fragments (tying with wires, internal splints, etc.) as likely to increase the danger of local inflammation and its results, and, averring that such fractures are rarely followed by deformity, advocated external support only."

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"*Dislocation of the Lower Jaw.*—It is necessary for the reduction of this dislocation that the pterygoids, masseters, and temporals should be relaxed, as being the chief or opposing forces in its reduction. During the voluntary act of depressing the lower jaw these muscles are relaxed, therefore, just as you press downward with the thumbs placed on the crowns of the posterior molars cause the patient to open the mouth a little. By this means the slightest pressure will be sufficient to disengage the necks of the condyles from the transverse roots of the zygomas, and will permit the temporals and masseters to at once reduce the dislocation by the reinduction of their normal action."—(Mr. D. KELLY, *Braithwaite's Retrospect.*)

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"*Casts; an Easy Method of Taking.*—Paint the part of which it is desired to take the cast with melted paraffin by means of a large brush, and as each layer dries put on another until the paraffin is a quarter of an inch thick or more, according to the size of the cast. During the few minutes in which the paraffin remains plastic, a sharp penknife is to be run over the lines requisite for the removal of the matrix. A cold

water cloth should then be placed over all for five minutes, when the pieces may be removed and reunited by a hot wire. Plaster is then to be run into the matrix in the usual way, and after it has set the paraffin is to be carefully broken off, and the cast dressed." (Mr. LAWSON TAIT, *Medical Times and Gazette. Ibid.*)

"*Constant Galvanic Current.*—The following observations may have occurred to others, but not having met with them published, they may be of value as tending to the perfection of our scientific instruments, by providing the source of a constant galvanic current, of large quantity and very great intensity: The bichromate of potash battery furnishes a current of great force, and its simplicity, economy, and convenience of management would make it preferable to the double fluid batteries, but for its want of constancy when a current of large quantity is required. Experimenting with it lately, I became satisfied of the cause of this defect. Although there may be a large reservoir of liquid, only the stratum between the plates is active, and no gas being given off there is no circulation; this soon becomes exhausted, and as it is renewed merely by diffusion, can only maintain a current equivalent to the fresh supply of liquid thus obtained. I therefore used a thin beaker as the containing vessel, and placed it over a Bunsen's burner capable of maintaining a moderate circulation of the liquid, and as I expected, the battery now gave its fullest force with absolute constancy until the complete exhaustion of the exciting fluid. Mechanical stirring of the liquid or motion of the plates will produce a similar result; and thus by any of the various modes which may be employed, this battery can be made to yield a current more powerful than any other known form without giving off any noxious gases, and as absolutely constant as can be desired."—(JOHN T. SPRAGUE, *Chemical News.*)

"*Magneto-electric Machine.*—Ladd's magneto-electric machine was pronounced to be superior to any other in the Exhibition. It is an improvement on the form adopted by Siemens and Wheatstone. Two flat plates compose the electro-magnet, and two Siemens armatures, one at each end, rotate between them, generating a constant and powerful stream of electricity. A small battery converts one of the plates into a magnet, and the electricity, being thus induced, goes on accumulating without the necessity of any further external supply from a battery. In fact, the fire once kindled increases every moment in violence while the machine continues to rotate, and the wear and tear of the plates and the small power required to rotate the armature are the only expense. As this power can be furnished by the machine itself, we have about as near an approach to a perpetual motion as we can ever hope to attain."—(*The Nation.*)

"*Galvanoplasty.*—In the application of the battery to electro-plating more progress has been made than in any other branch of the subject. It is only a few years since Jacobi first proposed to deposit metals from their solutions by the action of the galvanic current. At first the application was limited to one or two metals and to articles for table use. The art is now extended to apply to numerous metallic salts, and to the plating of articles of great size. There was exhibited in a separate building in the Park copies of antique and modern sculpture—of the

massive bronze doors of Florence; of Trajan's Column, which the Emperor has ordered to be copied in its natural proportions; and of numerous works of art, which were such perfect imitations of bronze that none but professional dealers could have decided upon their true character. Methods have been devised by which the exact amount of metal deposited upon any given object can be carefully weighed. In the case of gold and silver this is of particular importance. Great improvement has also been made in depositing metals which have hitherto not been considered as available for this purpose. The foundation, also, upon which to deposit the metal has been changed, and even glass and rubber have been employed with success. Specimens of the batteries employed, and of the balances for weighing the metals, and an infinite variety of samples of the work accomplished, were to be seen in the Exhibition."—(*Ibid.*)

"*Antidote for External Poisoning by Cyanide of Potassium.*—This substance is extensively used in electroplating and other arts, where its external poisoning effects produce many painful and troublesome ulcers on the hands of the workmen. The foreman of the gilding department of the American Watch Works writes to the Boston *Journal of Chemistry* that experience has taught him the most effectual remedy that can be employed in such cases, which is the proto-sulphate of iron in fine powder, rubbed up with raw linseed oil."—(*Sci. Amer.*)

Tungsten Steel.—In the proceedings of the Polytechnic Association of the American Institute, N. Y., it is stated that "Prof. VAN DER WEYDE exhibited a knife, the blade of which was made of tungsten steel. So admirable were the qualities of this blade that it cut glass like a diamond; experiment and examination showed that it did not merely scratch, but made a clean, diamond-like cut. The discussion turned upon Damascus steel, which was declared similar in nature to tungsten steel. Dr. Feuchtwanger stated that tungsten was found in this country in Nevada, and a mine had recently been discovered in Missouri. England has also an inexhaustible supply of this mineral. Prof. Joy said that tungsten is more difficult to fuse than manganese. Tungsten derives its name from the German, and means 'heavy stone.' Two per cent. of tungsten will make iron very hard."—(*American Artisan.*)

Petroleum in Vulcanizing.—"Petroleum may be used to vulcanize rubber, as it has the property of dissolving chloride of sulphur in the same manner as sulphuret of carbon. For this purpose it is necessary to have the petroleum perfectly anhydrous, so as not to decompose the chloride of sulphur. To obtain this result the ordinary petroleum is poured into a vessel, provided with a stirrer, with ten per cent. of sulphuric acid. The mixture is well stirred for some time, and then left to settle. The petroleum is decanted into a dry receiver, and half a pound of lime added to every twenty-five gallons of petroleum. By distillation a solvent convenient for the vulcanization of rubber is obtained."—(*Journal of Applied Chemistry.*)

Gutta-Percha protected from Heat.—"Gutta-percha may be made capable of resisting a high temperature by dipping it for a moment in sulphuric acid at 66°, and then washing it in water. An immersion of a few seconds is sufficient for pure gutta-percha, but if it contains as-

phaltum or india-rubber the operation lasts longer, extending even to a few minutes."—(*Ibid.*)

"*To Detect Alloys Representing Gold.*—To distinguish gilded objects from those which have only the appearance of gold is a very easy operation. For this purpose, use a solution of chloride of copper, and if the object is only an alloy, it is covered immediately with a brown spot, which is not the case if it is gold or gilded "—(*Ibid.*)

A New way for Cutting Glass—In relation to the proposed plan for making jars from otherwise useless bottles, L. W. HUBBELL & Co. state in the *Druggists' Circular* that "the simplest and cheapest way of making vessels of this kind is to tie a piece of slack twisted cotton twine, saturated in alcohol, around the bottle, when you want it cut off, set fire to it, and when the spirit is about exhausted, to plunge it into a basin of cold water. The bottle should, of course, be kept revolving slowly while the alcohol is burning."

"*How to Hold Pearls.*—It is stated that certain native artists resort to an ingenious plan for firmly securing in any desired position such pearls as they wish to drill or work upon. The gems are first fitted loosely in holes bored in a piece of soft wood. A few drops of water are then sprinkled over them, and this penetrating the fibres, causes the wood to swell, and the pearl is held as in a vice, but without marring it or in any way depreciating its value. After a time the water evaporates, the fibres gradually relax, and the gem is again set free."—(*Sci. Amer.*)

To Harden Plaster of Paris.—F. BOWLY, of Winchester, Va., writes to the *Scientific American*, "that when iron filings are mixed with plaster of Paris, they rapidly oxidize, and the coherent mass of oxide of iron formed, adds its own strength to that of the plaster, making a very firm mass, which has also the advantage of strongly uniting itself to surfaces of iron. I have not observed what proportion of the filings is best, but suppose they should form about one-fifth of the whole weight."

To Harden Plaster of Paris Casts, X. says (*Ibid.*): "A little glue dissolved in the water with which plaster is mixed will harden it to almost any degree Experiment will soon determine the proper quantity for the degree required."

BIBLIOGRAPHICAL.

The Boston Medical and Surgical Journal. This old and valued weekly appears in an enlarged form, under the supervision of DR. DAVID W. CHEEVER as principal, and DR OLIVER F. WADSWORTH assistant editor. With its greatly improved appearance, and practical contents, it promises to become more useful and prosperous than ever.

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THE

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ORIGINAL COMMUNICATIONS.

THE CAPILLARY SYSTEM.

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(Remarks made before the Odontographic Society of Pennsylvania, March 3d, 1868.)

GENTLEMEN,—In the absence of any other topic to engage our attention this evening, I have placed the microscope on the table, so that we may spend a few profitable moments in examining the capillary circulation in the various tissues and organs of the frog. As you are well aware, the constantly-recurring changes which the blood undergoes in respiration, nutrition, secretion, and other organic functions, take place in the smallest ramifications of the pulmonic and systemic circulation; and the subject acquires additional interest and importance from the fact, that the morbid changes which attend upon inflammation are intimately connected with an altered condition of the capillary system.

The web of the hind foot of the frog, the tongue, lungs, and mesentery of this animal (several of which are here ready for use), will be placed under the microscope, so that you may observe in these different structures the passage of the blood through the minute vessels which connect the arteries with the veins. Although investigations such as these are easy of accomplishment, only demanding a little time, patience, and devotion to the subject, yet it is a singular fact that comparatively few take the trouble to make them; and some even who assume the duty of imparting instruction on such subjects, depend upon the statements of others, rather than actual investigations of their own. Under these circumstances, it is not surprising that such erroneous views as that capillaries have open mouths, should be advanced even in this late day by some, and believed by others who know nothing of the matter except by hearsay. It may be said that it is a waste of time to refute

such palpable errors; and this would be true if the members of our profession in general were as well informed as they should be in matters of science; such, unfortunately, not being the case, it becomes a duty to present facts to the contrary, which those who will take the trouble can readily demonstrate for themselves.

Prior to the discovery of the capillary circulation by Malpighi, the general impression among anatomists was, that the arteries terminated in minute vessels with open mouths, and that the blood circulated through the parenchymatous structure of the different organs, in the same way in which a stream of water passes into a swamp or marshy ground, and, after slowly moving around, escapes from it through some outlet, forms a stream similar to that which supplied the marsh or swamp. The fallacy of this opinion has long since been recognized, and becomes readily apparent on observing the movement of the blood in the tissue under the microscope. You here see the blood (whose action is made evident by the movements of the red and white corpuscles) passing with great rapidity and by successive impulses—corresponding with the action of the heart—through the arterial radicals, and then entering the capillaries, which are much smaller in size, and where the current flows along definite and unchanging channels in a steady, uninterrupted stream, and at a much slower rate. The difference in the velocity is readily apparent even to the least experienced eye, and is capable of being measured with a tolerable degree of accuracy; and it has been estimated by reliable observers, that the blood moves in the capillaries at a rate somewhat less than one-thirtieth of an inch per second. As the distance between the arteries and veins is very slight, it requires but a short time for the blood to traverse the capillary system even at this slow rate, yet the time is sufficient to afford ample opportunities for the important changes which take place in the blood in this part of the circulation. In some of the vessels the corpuscles are rolling through in great numbers—four or more abreast—the red corpuscles occupying the centre of the stream, while the white ones are on the outside and moving much slower, frequently stopping for a moment or so, apparently becoming adherent to the sides of the vessels, and then passing on. In the smaller capillaries the corpuscles are moving two by two, and in the least of all in single file. The existence of serous vessels, which do not admit the red globules and liquor sanguinis together, is exceedingly questionable, and cannot be made obvious to the senses by the most delicate injections or dissections. In watching attentively the motion of the blood in the tissue under examination, you will occasionally see corpuscles enter passages which had escaped your notice before, and you might be led hastily to the conclusion that new channels had thus been opened; but a little experience soon proves to you that the fluid portion of the blood had been passing through them, and that some local

impediment for a time arrested the progress of the red corpuscles; but this being overcome, they pass through with freedom.

An interesting phenomenon observable in this connection is the variation in form constantly occurring in the corpuscles as they roll along from vessel to vessel. In the frog, the shape of corpuscles is oval, but when circulating in the blood as you here see, they sometimes become twisted, rolled upon themselves, or elongated so as to pass through tubes whose diameter is much less than the corpuscles, and then assume again their regular oval form.

Having observed the movements of the blood, it may be well to inquire into the structure of the capillaries. Careful dissection has demonstrated that the arteries are made up of at least three distinct structures: the external or areolar, the middle or muscular, and the internal or serous coats. As the arteries decrease in size and increase in number, these different tissues become less and less distinctly noticeable, until eventually there only remains the internal serous coat which, as a transparent, elastic, structureless membrane, with scattered oval nuclei, constitutes the proper walls of the capillaries, which, as we see, are arranged as a network with the parenchyma or elements of the tissue or organ embraced between the meshes. A relation can be traced, as a general thing, between the distribution of the capillary vessels and the functions they are destined to perform, and, on this account, to meet the demands of each portion of the organism, considerable variety is presented in the form of the capillary network in the different textures of the body, although they consist mainly of two kinds, the rounded and the elongated meshes; the former is the most common, and prevails in those parts where the capillaries are most numerous, as in the lungs, most of the glands, the mucous membrane, and cutis vera. These meshes are, however, more or less angular, and sometimes quadrangular rather than round. In the nervous and muscular systems the elongated meshes are formed by the vessels pursuing the course of the nerve-tubes and muscular fibres, and with short connecting branches above and below, thus forming parallelograms, whose long sides are six or eight times greater than the short ones. The capillaries are sometimes arranged in the form of loops, which start from a single vessel, as in the villi of the intestines, the papillæ of the tongue and skin, and in the rich plexus observable in an injected pulp of a tooth. The more active the function of a part, as a rule, the more vascular it is, and the closer its capillary network, and the larger its supply of blood. Even in the whitest textures, however, with the exception perhaps of the cornea and crystalline lens, there is no necessity for the supposition that they are supplied with serous vessels that merely admit of the passage of the liquor sanguinis, for those tissues which to the naked eye appear to be entirely devoid of blood-vessels, when placed under the microscope are found to have

small vessels, which admit of the red and white corpuscles passing through in fine rows.

A marked illustration of this fact is presented in the conjunctiva, which, on being irritated by the contact of a foreign substance, such as a grain of sand, etc., is followed in a few seconds by the appearance of a number of blood-vessels where there was not the slightest evidence of their presence before. Again, in observing the movement of the blood in the capillaries of the frog, no evidence is presented of alternate dilation or contraction of their walls, such as occurs in the arteries; but in the act of blushing, and in the enlargement of the vessels on the contact of foreign substances just referred to, and the subsequent return of the tubes to the normal size on the removal of the source of irritation demonstrates that they are capable of dilation and contraction, and that in inflammation, the reddened condition of the part is mainly due to the enlargement of old vessels rather than the formation of new ones. The diameter of the capillaries varies somewhat in the different textures of the body, but the average size is about $\frac{1}{3000}$ of an inch.

Our investigations this evening must satisfy you that the capillary vessels are merely the fine tubes which form the connecting link between the arteries and the veins; in other words, that there are no exhalent or other vessels terminating by open mouths in the tissues. You can readily conceive what an unfortunate condition of things would supervene if such was the case, and how entirely it would arrest the harmonious action of the different tissues and organs of the body. When recalling the permeability of organic structures, the necessity of such a condition of things is certainly not apparent, but the reverse, for the purposes of respiration, nutrition, secretion, etc.

The transfusion of gases through membranes, the transudation of liquids through similar structures, proves beyond a question of doubt that respiration and nutrition can be and are effected by endosmotic and exosmotic action, and no position assumed by the physiologist appears to be more clearly established than that nutrition is *extra-vascular*, or outside of the capillary vessels, and that these vessels are to be merely regarded in the light of conduits or carriers of nutrient materials which pass out through their walls in an *exosmotic* current to the tissues, and that the refuse or broken-down structure is drawn into the vessels by an *endosmotic* current.

We cannot examine the circulation of the blood in the pulp of a tooth, but from what we have here seen of the capillary circulation in other tissues, and from mounted injected specimens of the dental pulp, we are justified in inferring that there is *no such arrangement as open-mouthed vessels in the dental pulp*, and that the process of nutrition is the same in dentine as elsewhere—*i.e.* outside of the vessels or by extra-vascular nutrition.

IMPRESSIONS.

BY F. K. CROSBY, D.D.S., LYNN, MASS.

THE necessity of accuracy and skill in obtaining the impression, the basic operation in the construction of artificial dentures, is too apparent to require demonstration. Without these requisites, success, if attained at all, is merely the effect of accident, of a felicitous combination of circumstances sufficiently potent to produce the desired result in spite of inattention or lack of skill. The subject has received at the hands of the profession that consideration which its importance demands, but there yet remain widely differing opinions relating to it. A limited investigation into the nature and comparative value of the substances employed may assist us in determining the mooted points to our own satisfaction. The decision will, in all probability, be in accordance with our preconceived ideas and prejudices; we are all joined to our idols.

Plaster and wax are the only materials which have found permanent favor for the purpose of impressions; certain mixtures of wax and gutta-percha, and wax and paraffine, have from time to time claimed advantages not possessed by either of the simple substances; but their employment is exceedingly limited. With the two articles first mentioned, satisfactory results may be invariably obtained, where such a result is possible. Let us proceed to consider their respective natures and merits.

Plaster, or plaster of Paris, is prepared from gypsum or sulphate of lime, which in a pure state is composed of 28 parts lime, 40 sulphuric acid, and 18 of water. Exposed to a heat varying from about 300° to 500°, the combined water escapes; the resultant product of this calcination is plaster, which possesses the property, when mixed with water, of hardening with a species of crystallization. During this process an evolution of heat often occurs, but this happens only when the calcination was effected at a lower degree than 300°. While solidification is taking place, the plaster expands in consequence of the absorption of water by its particles (Harris), filling the finest lines and copying the minutest characteristics of the part whose representation is desired. Some, conceiving this property to be detrimental, have entered upon experiments for the purpose of counteracting it. The difficulty is of but little practical moment. In plaster models obtained from impressions, the expansion of the plaster may produce a certain increase in size; but considering the numberless successful cases in which no action has been taken to prevent it, it becomes a matter of doubt whether this expansion has a practically injurious effect. With metallic plates, the shrinkage of the die certainly counteracts the expansion of the model. In the taking of impressions the property is an exceedingly valuable one; expanding in all directions, the mass of plaster increases in bulk, but the impression

itself suffers no deleterious change, the expansive force acting directly against the mouth, filling every line and securing a most accurate impression. At a late meeting of a Dental Association, it was announced that, by the use of lime-water in mixing, the expansion would be prevented. This may be practically true, but theoretically it is difficult of explanation. M. Gay-Lussac, in the *Annales de Chimie*, states that gypsum, after having been calcined, will, in setting, always resume its original solidity, whether that were hard or otherwise; that "it is the primitive molecular arrangement which is regenerated." Now, if the original state is reassumed, it must take into combination the original amount of water; if the absorption of water causes expansion, the original amount of water will cause the original amount of expansion. To interfere with this expansion would be to prevent the restoration of the primitive molecular condition, a supposition entirely at variance with possibility if we accept the rule of M. Lussac. If these dicta of Harris and of Lussac be true, it is difficult to understand the nature of the process by which lime-water arrests the expansion of plaster. The last-named authority alludes to the addition of lime, and says that it does not promote solidity, but makes no mention of any such phenomenon produced by its use. The statement may nevertheless be true; the test of practice frequently refutes the most plausible theories.

Such being the nature of plaster, we come to consider the manner of its employment. The books advise that it be mixed quite thin, of the consistency of cream; but, unless the plaster be very quick-setting, it may be mixed considerably thicker, securing greater neatness in its application and greater strength to the impression. By building up the plaster in the middle of the cup rather higher than elsewhere, we insure an impression of the arch, a point which the plaster sometimes fails to reach if not applied in this manner. When introduced into the mouth, it is an excellent rule to first press up the *heel* of the cup; this prevents the plaster from running into the throat, and forces it forward to the anterior portion of the ridge, affording sufficient material for a correct impression of this important part, and at the same time securing an accurate representation of the tuberosities and the posterior portion of the palate. The time required for setting varies with the nature of the plaster. Harris gives four minutes as the average time which good plaster should occupy in hardening; but he advises that the impression be retained in the mouth until the plaster in the bowl breaks with a sharp fracture. Experience teaches that there is no necessity for such a degree of hardness; if the plaster in the bowl crumbles stiffly under the spatula, the impression can be removed with safety; it will be somewhat harder in the mouth than in the bowl. Much less difficulty will be encountered on the removal of the cup, and the time will be proportionately shortened. The purest plasters are those which harden least,

proving that absolute purity is not an essential qualification, but rather the reverse.

In removing the impression from the mouth, it must, of course, be gradually loosened from its attachment. This is best accomplished by depressing the heel of the cup. From this point the air can obtain the readiest access; and when, as is sometimes the case, the impression gives way suddenly, there is less danger of fracturing the narrow rim of plaster lying between the front of the cup and the anterior alveolar ridge, than when the handle of the cup is depressed. This is especially true when the ridge happens to be projecting, as, the impression being loosened by the depression of the heel of the cup, it can be disengaged from the ridge by a slight forward movement, and removed from the mouth entire.

What has thus far been said relates, of course, to upper impressions. The same general rules apply to the lower, merely reversing the suggestions given regarding the depression of the heel in detaching the cup. In many of the lower impression cups, the parts which are to cover the tuberosities are not sufficiently deep, consequently, the cup being arrested by the tuberosities and the anterior alveolar ridge, the buccal portion of the ridge is at some distance from the cup, preventing oftentimes a correct impression, unless the plaster is greatly in excess. When a cup cannot be obtained which conforms in its outlines to the shape of the ridge, the difficulty may be obviated by bending up the ends to accommodate the prominences referred to.

The impression being obtained, it remains only to prepare it for the reception of the plaster which is to constitute the model. That there may be no adhesion of the surfaces, various methods are employed; a thin coating of varnish, to prevent the absorption of the oil, which is next applied, is extensively used; some prefer a solution of soap, into which the impression is dipped or with which it is painted. If the latter is used, the addition of some coloring matter will facilitate the separation of the parts by more clearly indicating the point of division between them. By the exercise of a little care the impression may often be retained for a second model; it is indeed generally advisable to lay aside the first, and make another, upon which the teeth are arranged. We may then, before vulcanizing, transfer the set to the first model, which will be found free from accidental scratches and from the abrasion of the base plate. There will be less danger of injuring the model in withdrawing, if in trimming down the circumference a wide shoulder is left projecting over the border of the impression, to sustain the force of the knife when introduced for the purpose of separation; when the model is trimmed down even with the impression, some portion of the ridge is frequently broken down.

Wax is not, as has been very generally supposed, a vegetable pro-

duct derived from plants, but is a purely animal secretion, furnished by certain sacs upon the abdomen of the bee, and afterward deposited to form the cells in the comb. This has been proved by feeding the bees exclusively upon honey or sugar, when the wax was found to be still secreted. The peculiar smell is derived from the honey with which it has been associated; the wax of those cells in which no honey has been deposited is scentless. The ordinary wax is obtained by washing and melting the combs. It is, when unadulterated, of a bright-yellow color, and presents upon breaking a glistening granular appearance; melts at 142°, but a heat of 80° renders it sufficiently plastic to be moulded into any form. White wax is produced by melting and straining the yellow to deprive it of its impurities, and bleaching it by exposure to air, light, and moisture. It then becomes white, and when pure is without taste or smell; melts at 154°. A great portion of the wax of commerce is adulterated by the introduction of various foreign substances. As it is claimed by the advocates of the use of wax in impressions that it should be perfectly pure, it will be instructive to note what impurities are most commonly employed and the means of detecting their presence. With the yellow variety earth and meal are frequently incorporated: they serve to make the wax grayish in color and of a brittle nature; by melting and straining, the adulteration is apparent. Resin is also employed in the same manner; it destroys the granular appearance, rendering the fracture smooth and shining; alcohol will dissolve it and leave the wax untouched Tallow and suet make the wax much softer, and cause it to emit an unpleasant odor upon melting. White wax is adulterated with spermaceti and stearine: the former makes it softer and destroys its lustre; the latter renders it crumbly; their presence is attested by a peculiar fatty odor when melted.

For impressions the wax requires to be made sufficiently plastic to admit of being moulded into any form. It should not be heated to such an extent as to become sticky or to appear shiny upon the surface. By holding the wax at some distance from the flame (if dry heat is used), it is softened gradually and equally. The operation of taking the impression is simple; the softened wax should be pressed into every part whose representation is desired, held there until cool, and carefully withdrawn. The cooling is sometimes hastened by holding a small piece of ice in a napkin against the lower part of the cup. There has been constructed for this purpose a cup with a false bottom, leaving a space into which cold water is introduced. For partial cases a most accurate impression can be obtained by first taking an impression in wax, enlarging the spaces left by the teeth, scoring the surface of the wax, covering with a thin coating of plaster, and taking the impression a second time. Whatever inaccuracies may have been left in the wax are by this process remedied. When, from the position of the teeth on the model, it is

feared that they may be broken in withdrawing, by bending over the point of an ordinary pin and inserting it head downward into the space left by the tooth before filling the impression, the difficulty will be removed; even if the tooth is broken, the head of the pin will prevent its detachment.

As intimated in the beginning of the article, there will be little advantage gained by arguing at length concerning the respective merits of plaster and wax for the taking of impressions. It would seem indisputable, however, that an impression in wax cannot be taken with the same certainty of perfection, by the same exercise of skill, as one in plaster. Plaster, as has been shown, expands into every line, and hardening, fixes it permanently in the impression; wax requires to be forcibly pressed against every part, and the least haste or inaccuracy in withdrawing is liable to result in change. Plaster does not displace the soft parts; wax takes their impression while in a state of displacement. What is to restore to the wax a representation of the parts in their normal condition? It would appear that a careful investigation into the merits of the two substances must confirm the mind in the belief that plaster is by all means the article to be preferred. Were we all to adopt the method of a distinguished member of the profession, who states that he has used the *same* wax over and again for ten years, our patients would doubtless heartily coincide in the opinion above expressed.

ON THE RELATIONS OF OXYGEN AND CARBONIC ACID TO THE COLOR OF THE BLOOD.

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BERNARD actually attributes to carbonic acid the power of determining the *place* of this delivery of oxygen; and hence to its absence (stated to be the case in that of red blood in veins of glands) is due the retention of oxygen beyond that place. There is, however, no *nexus* between these two things. The blood does not *retain* its oxygen, but gives it up in the same *time* as before, but at a place in the circuit, which, at the usual rate and character of its flow, requires more time to be reached. Hence, in the latter case, its oxygen is surrendered or discharged at a point reached in the same *time*. Bernard, therefore, attributes to the carbonic acid explicitly the power of determining the yield of this oxygen; an event which can only possibly be accomplished by direct displacement of oxygen—since the carbonic acid must enter the globule, if it darkens it as he mentions. But the notion is ludicrously insupportable; for if the oxygen be retained beyond its usual limits

(not beyond its usual *time*), the retention is due to the elements involved, and not to carbonic acid not *present*. But there is no *relevancy* in the *explanation*.

The reader may ask, what is our explanation? We have given it in substance. But let us ask him, if the above notion is not due to the existence of the supposition that there is some action somewhere in the system the converse of this—namely, of carbonic acid causing the blood to turn dark? This is, that it turns *light* in the lungs. The fallacy being that since it turns light in the lungs by oxygen, one substance, it must turn dark away from the lungs, by another substance—carbonic acid. According to Bernard, as represented in the case of the salivary glands, the carbonic acid breaks up or dissolves at a certain point the relation of the oxygen to the corpuscle, and separates them. We ourselves held the idea, for it enters into every form of the notion that carbonic acid darkens the blood; that the relation of the globule and its oxygen is broken up by carbonic acid. But the truth is, this relation is kept up by the factors to it, just for the moments required to subserve the physiological end and *purpose* of it—that is, to distribute the oxygen equally throughout the blood-liquor. And the very nature of the relation is transient. This relation is not of a nature requiring another factor to *undo* it. The globule takes and *gives off* or loses oxygen. If oxidized blood, or arterial blood, which has become darkened (or venous), will give off carbonic acid, arterial blood will give off oxygen and darken thereby.

Has the writer of this notion, that the carbonic acid in the blood enters the red corpuscles, and causes the change in its color to venous, ever really distinctified its character? We are perfectly confident he has not. For the supposed fact, but utterly false supposition, is entirely contrary to the character of any chemical proceeding even. That the carbonic acid should have some affinity or aptness for the substance *in* the globule (the oxygen), and in following this affinity, join this substance, would be a supposed act of chemical character; but that it enacts the part of first separating from the plasma, and then of entering the globule, and separating between it and the globular substance, thus, as a third party, transacting a disunion between the oxygen and globule, is totally contrary to facts and reason.

"But," says the reader, "we admit this; it being plain enough. The carbonic acid does not enter the globule to expel the oxygen, and not until after the oxygen is lost; it does not *expel* it." Then the carbonic acid does not make any *change* in the arterial hue. Beside, then, your whole notion, that the carbonic acid causes the dark color, is inadvertently but openly abandoned, and confessed to be an error. For this notion was, that the dark color was caused by carbonic acid; this notion was, that the dark color was a *change* from the arterial hue—by what?

By the carbonic acid! That *it* darkened the blood; that it *changed* the arterial globular hue to dark.

And if we admit that the carbonic acid does not do this, then we say no *change* is accomplished. But that, properly speaking, what is done, which we have incorrectly called a "change," is simply a return or recurrence to the dark color; demanding no antecedent *act* to explain it, except the withdrawal from the globule of the substance which it had in becoming red. This withdrawal could only leave that color *precisely* as it found it—namely, dark or venous. If, as most erroneously supposed, the carbonic acid caused this, it must do it by some action while yet the blood is arterial—and *by* displacing the oxygen—of course before the oxygen has left the globule. For this falsely supposed action of the carbonic acid is precisely what it is supposed and openly stated, makes the blood cease to be arterial, and makes it venous. And what makes the blood *arterial* is the continuance of the oxygen in it. And precisely what is alleged of carbonic acid, is that it puts an end to this—or stop to it—so making the blood dark or venous. This, if done by it, can only be done by discharging or displacing the oxygen, and taking its place. To say that the carbonic acid only comes into play after the oxygen leaves, is saying that the oxygen leaves of itself, or some other cause, and that it is only *after* this is *done*, and not in the *doing* of it, the carbonic acid takes part in affecting the globule. But let us inquire, what is the exact nature of the occurrence, *pending* the supposed junction of the carbonic acid with the red globule, as it (is supposed) does not take place until *after* the oxygen is lost to the globule? The oxygen leaves the globule. Let me ask the reader's full attention to this question. The question is: What is the exact nature of the occurrence pending the junction of the carbonic acid with the red globule? The oxygen *leaves* the globule. This is now affirmed as true by all sides. Does the oxygen leave the globule precisely as it *was when it was in it?* Certainly not; it cannot continue the color after leaving the globule; and what can its leaving do, but leave the color precisely as it was before—namely, purple red? Well, then, it leaves it precisely as it was when it was not in it, when it found a color on entering it. It was arterialized and of a scarlet hue. This hue is entirely due to the presence of the oxygen in it. And this also is affirmed on all sides, and is certainly true. But does the oxygen in withdrawing its presence, leave the globule precisely as it was *during its presence?* Does the globule continue of the same arterial hue? The question seems derisive, such is the certainty of the answer. Certainly not! This is impossible, since its arterial hue is solely due to the oxygen in the globule; it cannot possibly remain of that hue, if the oxygen—the very cause of it—be removed from it.

Does the oxygen not then leave the globule as it found it? That is to say, does it not leave it as it was before being arterialized, or unar-

terialized? What was the globule when the oxygen *found* it? Was it not venous or dark? Certainly! Does not the answer to this inquiry instruct us as to the exact nature of the "change" identified with the entrance of the oxygen? Is it not made palpable then, that this "*change*" is not at all an effect, which once made, lasts until some other effect at some other time *supersedes it?* Is it not, in short, a phenomenon of different *character* from what we usually call an effect—a change or affection of a substance, which is only for the time being, or until the oxygen, the presence of which induces the change, separates? Could the oxygen continue *this* change after its presence is withdrawn? Certainly not! Further, is this withdrawal a change? As certainly not, but marks the return to that condition when the change no longer is or exists. This condition is precisely that of the color of the globule in which the oxygen found it; is venous or dark in color. In short, this withdrawal is the *dis*continuance of the change. This discontinuance is that of the arterial hue. But this discontinuance, being no positive beginning or progress of change, being no doing, but a *non*-continuance of a doing, accordingly does not obliterate or cause to be *lost* the globular-substance color, any more than it does the muscular-substance color, which therefore *remains.* Whatever this color is, it is certainly not dissipated. For this cannot be done without dissipation of the colored *substance.* Moreover, dissipation is an act, whereas we have marked that the withdrawal of the oxygen is a *non-continuance* of the act of junction with the globule.

We are now at the moment of time *pending* the entrance of carbonic acid, which the reader has said did not discharge the carbonic acid color nor affect the globule (in accordance with his own supposition) until after. *Now,* what is the exact state of things? The arterial color discontinued, the globular-substance color remaining. It is, the reader assumes, in this condition that the carbonic acid may darken the globule. But is not the globule already dark? It can only do this by entering into some kind of union with it. Why should carbonic acid leave the plasma and do this? The answer to this question we have already given. But we repeat, that it cannot do so. Carbonic acid gas cannot unite with the globule. It cannot be made to do so. It has no affinity for any substance, and if it *could* do so (which it cannot), the organic affinities, properties, and qualities of the globule would, even on chemical laws, certainly at least *regulate* the transaction, would in fact be the active agent of it. And its act alone would constitute the transaction. The globule has no affinity for carbonic acid, and cannot be *induced to absorb it.* Carbonic acid is a form of substance, which will not appropriate nor be appropriated. It will undergo decomposition of its elements, and if it did so in the blood-channels, *one* of its elements, namely, its oxygen, might be supposed to enter the globule. But this is purely and merely

imaginary; that is to say, is seen to have no existence *in fact.* No physiological *purpose* could be even imagined to be subserved by such decomposition, and we have amply shown that none could be subserved by the carbonic acid itself entering the globule. It is already in the very best medium of transport to the lungs. As it does not enter the globule it cannot affect its color. And the color of the globule which remains after discontinuance of arterialization, continues until the oxygen again makes a change in that color,

The reader, we think, will now be voluntarily and frankly disposed to confess that we have most amply and carefully considered every point he has made (or we for him) which enters into the question, even up to the very verge of the bounds of reason; that we have deferred to all his suppositions and questionings, and exercised no adroitness of argument against them. But, still, let us dwell upon the facts a little longer, if we can thereby gain a clearer and ampler apprehension than we have yet got of their nature.

All accounts, without exception, represent that the globule takes up oxygen from the air in the lungs, and *loses it* elsewhere in the blood. The course of our own statements has several times involved this fact. By this is not meant the loss or disappearance of the oxygen in the globule. Such a statement (of course there could be no such *idea*) is the very extreme of childish puerility, of a person already incompetent from want of mental power, or at least of mental maturity, to really *think* of the subject. No person of the least mind would make any such statement, since the most palpable of things is the continued presence of the oxygen, and this is so plain to the senses as to be the most observed of all physiological phenomena by the eye.

Now, why does this loss occur? or what *makes* this loss? The theory that carbonic acid darkens the blood, says it is made by the carbonic acid. But the truth is that no third factor can make the parties to this transaction. No other substances, separate in the blood, can *make* the globule lose its oxygen. On the contrary, the "loss" of the oxygen, is an event which ensues on the nature of the conjunction of the factors. These determine the character of the transaction in *taking it up.* Their "union" is *not* of any such character as we usually describe by that term.

It is not a "union" in that sense. The oxygen does not unite with the atomic components of the substance of globules in any *such* sense. This conjunction endures but for a very short period, scarcely more than a few seconds, when the oxygen is lost, that is, left behind in the plasma. The question was *why* this took place? We do not know why. We do not know *why* the oxygen is taken up.

Nevertheless, we are entirely persuaded that the physiological act of delivery or loss of oxygen to the plasma occurs in virtue of the affinity

of the oxygen itself for substances in the blood liquor, with which it is to *unite*, and their affinity for it. The plasma is replete with such substances. That such a *union* is effected almost simultaneously with the loss by the globule of the oxygen, is demonstrated. And the fact of its immediateness can only be accounted for by a recognition of the prior fact of the reciprocal affinity of the oxygen and the substances in the plasma to be *oxidized*. For, if pyrogallic acid, a substance having the most eager affinity for oxygen, be introduced into the veins, it will leave the body by the veins beyond, without any oxygen. Thus showing that there is no ununited oxygen present.

But whatever the character of the conjunction between the globule and the oxygen in the first instance, the indisputable fact is that the oxygen is lost in its course through the plasma. And that it is *not* lost by any action or displacing power over the conjunction, by the carbonic acid, we have amply shown. In the course of our statement of facts, we have probably met every question the reader was impelled to ask, and answered every demand to the uttermost limits of the bounds of reason.

Bernard therefore is obviously right when he attributes the bright color of the arterial blood to the continuance of the oxygen. And if, therefore, prior to that point in the circulation, the oxygen had been discharged, the blood would no longer have been bright, but dark. Now, whether the carbonic acid did or not *discharge* the oxygen, a non-continuance of the oxygen in the globule was the indisputable cause of non-continuance of the *scarlet* color. Now, whatever the carbonic acid may have done to the globule, or to its oxygen, whatever possible change it may be imagined to have made in either, the loss of the scarlet color is the certain consequence of the loss of oxygen. That *loss of oxygen* may have been due to carbonic acid; but the loss of color was due to the loss of oxygen. Now, what was this loss of scarlet—this consequence? What is this discontinued scarlet color identified with?—identified with as its very basis, *in* which alone it had an existence, which, in fact, *constituted* all it was—constituted its color, of which the scarlet was only a shade? Some one may answer, the globule. But this would be a very imperfect answer. The complete answer would be the color-substance of the globules. Now, what was the shade of this turned to scarlet? Of course, the venous hue? So that we have in the loss of the scarlet the sole consequence of the loss of oxygen, another effected tint, the venous hue from which it proceeded, and *in* which it was a change. The "cause" of the continuance of oxygen in the globule of arterial blood, at a point more distant from the heart than ordinary, *i.e.* for a few seconds longer, is the cause of the continuance of the red color, the ordinary time. In other words, the cause of the red color of blood for the usual time, and at the usual point in the circuit

when it becomes purple red, is one and the same cause, for the longer continuance of the same color and up to a point further from the heart. No new or other cause is demanded.

But we have long since passed the necessity of any continuance of an argumentative array of facts. Let the reader ask himself if there be any facts or any reason, in accord with them, to suppose that the blood corpuscles have no color, except what is made or produced by the carbonic acid. He cannot make such a color of the red, for this is exclusively due to the oxygen, it being the same color which alternates with the reddish purple, and is not a change in that color, but the advent of another color, *i.e.* the changing of one *color* for another color. Else why does he say the carbonic acid causes or makes the dark color?

But is there no means of demonstrating the truth we have been presenting. Is there, in other words, no experimentation by which we can make appreciable to the sense, the fact that the dark color of the blood is not due to carbonic acid. Hitherto we have withheld allusion to the demonstration, because we were fully aware that the truth of these demonstrations, their exact import, would not be discerned except on a prior apprehension of the facts we have cited.

We have cited the fact, that if red blood be exposed to the air it becomes dark, and this without the intervention of carbonic acid; for the event will occur if carbonic acid be carefully and utterly excluded from it. Why should this be so? There is but one imaginable reason. It is because the blood parts with its oxygen. What will cause it to become light again? Nothing but the reabsorption of oxygen. But if the dark color ensue upon that *loss* of oxygen, what event can that recurrence of color be due to but the departure of the oxygen? Of course, if we do not see that this dark is a mere resuming of the proper color of the globule, but if instead of that think it a positive production of color in like manner as we suppose the reddening to be, and hence think the first to be *one* color alternate with the latter a second color,—then neither the *loss* of the carbonic acid on the one hand, will be a return to red, nor of the oxygen, on the other, a return to dark. Because neither of these are a "change" in the true sense. A change means and implies as necessary to having any basis or any being whatever, one color in which it takes place, and in which it *begins* by the cause of the change becoming present, and in which it *ends*, by that cause being remitted. Now you use the word "change" to describe a totally different event, meaning by it two events, productive equally, each of a color, without "change," truly speaking. In this supposition no idea *enters* of the fact, that only one color really *pre-exists*, and *that* it is which is "changed."

The fact exists that whatever change of color takes place in the globule is a change in the coloring matter of the globule. The mere

existence of this coloring matter is a fact which enters into all consideration of the change. This coloring matter, although involved in the anatomical form of the globule, is easily brought into solution. This solution can be easily subjected to spectrum analysis. When such a solution of arterial blood is interposed in the way of a ray of light, which passes through a prism, two peculiar bands make their appearance consequent thereon in the spectrum. This is true of arterial blood, not of its plasma, but of the coloring matter of its globules alone.

When, however, this solution is "treated" with a reducing agent, which is an agent which *absorbs its oxygen* to itself, and retains it, the arterial color of the solution *instantly changes* to purple-red, or venous hue. If this solution be examined by the spectroscope, the two dark lines, characteristic of arterial blood, have disappeared, and in their stead a single line in a position intermediate to them appears. If we now shake the tube with fresh air, the scarlet or arterial hue returns, the two lines characteristic of this in the spectrum reappear, but after a few minutes again disappear, and this alteration can be repeated many times.

But this is not all, not indeed the most essential detail of the experiments. When a solution of blood corpuscles of arterialized blood is excluded from the air, *it slowly parts with its oxygen to its own fluid*, and thereafter shows in the spectrum of the spectroscope the *one*-line spectrum of purple cruorine, a venous or coloring matter. If in this state the tube be opened and shaken in the air, the scarlet color returns certified by the two-line spectrum. In this experiment it is demonstrated that the arterialized coloring matter will deliver its oxygen to the serum. In short, it will take up oxygen when without it and venous, and deliver it to its fluid when it has it.

These experiments show that prior to taking oxygen, the coloring matter of the blood is of venous hue, and that by that it becomes red, from which it again returns to the venous hue. The regular appearance of the venous hue did not involve carbonic acid at all. No carbonic acid was introduced, and none was involved in the conditions of the demonstration. The dark hue in fact was that of the globular hematine intervening between the regularly recurring periods of red by the access of oxygen. They show too that the dark color—its return—was not a "change," but the discontinuance of the change, which consisted in the ruddy hue.

But more than this, they show that the oxygen is capable of as regularly leaving the coloring matter of arterial blood, as it is of being taken up by it. Now, we observe that this purple-red hue, giving its characteristic lines, is invariably present when the oxygen has quit it, without the access or intervention of any other substance, as for instance, carbonic acid. Thus *demonstrating* that the purple-red is not

due to any change in it by the access of any such substance. And although the reporter of this experiment himself calls this a "change," it is evident that the phenomenon of change has passed, and that no other phenomenon of change has followed it, or exists in the recurrence of the purple-red!—showing that though the red hue is a change in it, the purple is not, being the organic color of the globule in which the change occurs.

This is, indeed, the first demonstration which has ever been made as to whether the carbonic acid does or does not color the globule, and it is a demonstration that this substance is not concerned in any way, directly or indirectly, in the production of any color of the globule.

But it demonstrates far more than this—namely, that this purple-red or venous hue is not *produced* by any substance coming to the globule in the course of the circulation, but is, instead of being produced, the one organic hue of the globular substance, which belongs to its constitutive elements, irrespective of any such other substance as may be contained in the liquid of the blood.

I repeat, then, that these experiments are the first demonstration ever made in the history of physiology, which determines whether carbonic acid has anything to do with the color of the globule; and they utterly negative the purely imaginary supposition that there ever was any demonstration that it caused the purple-red hue of venous blood. But not alone this, but by supplying the facts, so perfectly freed from any embarrassing elements, they distinguish between the latter and our existing supposition respecting the color of the blood, so sharply as to show what we have called knowledge to be mere *supposition* without any corresponding facts in nature.

They show, with the most ample clearness, that the purple-red hue is not any change at all, by conversion of the substance of the blood globule from one color to another, and that no such converting process, or any process at all, takes place when the red hue is discontinued; that, in fact, no *process* at all supervenes on the discontinuance of the red hue, for that the only process of any character there is in the case, is that which already had come and gone in the appearance of the red hue. The fact that the oxygen leaves the globule, thus ending the change of color (not a *color* in itself) it induced, while yet the globule, thus left without further change, is purple-red, demonstrates that the latter is its color, irrespective of any change whatever, and hence that it is not the consummation of any process by which, for the time being, it is made dark. In fact, that the blood is dark not in virtue of any process of any kind which regularly occurs, when, where, and in circumstances we name change, but *being* dark irrespective of change, undergoes a change of that color, of longer or shorter duration, on the access of oxygen.

And the only process at all in the case is not a *process* going on during or continuous with the duration of the red hue, but one consummated at once in the lungs, for the whole time being of the duration to the capillaries.

If we commence by regarding these two as distinct events, like that of the supposed nature of carbonic acid taking possession of the globule, we of course must think the venous hue a positive act, as well as the arterial. In this case both have equally to be accounted for, not as complementary, but as *distinct* acts. If, indeed, it were a distinct and positive act—this return of the blood to venous hue—we should be obliged to suppose a positive agent to effect this discontinuance. Undoubtedly, without our scanning the particular itself, there enters into our notion of this return to dark or venous hue, the opposite of the truth. This opposite is, that what precedes the venous hue, namely, the reddening, is a positive effect (precisely as the reader supposes that of the carbonic acid to be), whose continuation can only be broken or *dis*continued—and hence the blood made dark—by another act (of the carbonic acid), which either puts this otherwise continued effect away, causes it to be gone, or dismisses it (which is what he believes the supposed positive act of carbonic acid does), and so ends the red hue. But the truth is, that this *character* of a positive act continued until prevented, of the reddening of the blood, does not exist. We have not represented that it is of this supposed and implied character. If the reader has so understood us, he has not apprehended our representations of this vital point, upon which all the incidental points turn. On the contrary, we have everywhere explicitly represented that this reddening of the blood is *not* a phenomenon of the above character. Our representation lies in showing that the reddening of the blood is not of this (on the reader's part) supposed and implied character. If we had ever thought this reddening act was of *this* character, then the reader would have a good right to suppose it an act the *converse* of the act he supposes the carbonic acid to do—an act, that is, which puts an end to the venous color, as he supposes the carbonic acid to put an end to the red color. On the contrary, however, we have thought of no such character belonging to the red color; we have continuously said that this red color did not put an end at all to the dark or venous.

If we *had* said this, we were saying that the venous color had to be *reconstituted* every time the red hue had taken place. If, therefore, we had made this statement, by representing that the reddening put *an end to the* venous color, the reader himself would have renounced it, preferring his own supposition. For, instead of it, he supposes that the act of the carbonic acid is to *supplant* the red hue by another color—the dark or venous; and he also supposes the dark hue in its turn to be supplanted or displaced by the red hue in its turn, for the time being—both these

alternately. But we have not represented this supposed reconstitution any more than we have his supposed supplanting of colors, one by another and one of another, each in turn, alternately, by carbonic acid and the oxygen. These representations are alike to us untrue. The error of reconstitution is the more definite of the two. But it *involves* his notion of displacement of color. For the act of reconstitution, if supposed to take place, is supposed to take place by displacing the previous color, namely, the red at one time, the dark at another, each in its turn, by displacing the color preliminary to, or during the act for, the advent of the incoming color.

No; on the contrary, what we have sought to make plain was, that no such putting an end to or displacing or substituting of color, involved alike in his supposition and that of reconstitution, was done by carbonic acid in the case of one color, and neither was it done by oxygen in the case of the other color. And what we make plain now, is that all these forms of supposition are devoid of and stand in opposition to the truth.

In order to fix the reader's attention exclusively upon the fact which involves the truth, and from which we have digressed in order to guard against misapprehension on his part, or to correct it if it be, let us ask him what we have said about the reddening of the blood by oxygen. We represented it to have a character, and, moreover, a character wherein lies the whole truth. In defining this character, in drawing it, convinced that therein lay the point to be apprehended, we were constrained to deny that this act was in character at all like what we supposed the act of carbonic acid to be, in the erroneous notion that it darkened the blood. We defined this difference, for in these respective characters, so discriminated, the truth lay on the one hand, and its opposing error on the other.

What did we say of the red hue of blood? We said it was a "change" in the color. What "color?"—the scarlet color? Obviously not. But in whatever was changed. What was this which was *changed?* Obviously the color of the globule. Now, what was this color of the globule? We mean, what was the color in which the change *ensues?* We defer the answer for the present, and ask, was this "change" the thing or color of substance in which it ensued, or some passing *affection* (change) of that thing? Is it possible that we can deny a true answer to the question? What we mean by the change is not the *thing itself,*—that being given, as existing both during the change and before and after it,—but some passing affection of it.

The thing, in short, is *not,* in some *respects,* what it was an instant before. Now, there is nothing in the thing itself which *works* this change. This we know with entire certainty. This change in it, then, reqpires the advent of another factor. This is the oxygen. The change *ensues* upon the advent of this factor. All this is very true and very

plain. The oxygen contributes its substance to the thing, and by their coming together the change in the thing ensues. Now, we may ask if the color of the thing was *lost* in this change?—lost by what, by the oxygen? But it will reappear again shortly. Is it not rather embodied in, incorporated in, and perfectly identified with the *red* hue? The colored thing cannot be *lost;* but is not its color identified with the substance of the thing, and one of its constitutive qualities? is it not in fact a constitutive in part of its identity or individuality? Certainly! But the oxygen cannot cause the loss of the thing. How can it cause the loss of its color, unless it remove its constituent parts? If we could suppose such a question, that is to say, if we did not, seeing beforehand that it involved what we knew was false, and was therefore precluded as a question in search of truth, we might ask if the oxygen *discharged* this color of the thing? It would then be colorless, which it is not. But let us, then, in a supposition of some character, assume that the oxygen, after having discharged the color and made it colorless, gave red color to this just colorless thing. All these suppositions we see, and all other suppositions, which the advent of another color in the globular substance, or the discharge of its own color (the former involves the latter), confess themselves false in their very utterance. But let us pursue these suppositions, if thereby we can get to the bottom of the matter, and thus elicit the truth once for all. We digressed, then, where the oxygen had discharged the venous hue (*one* color), and, the globule first becoming colorless thereby, had substituted or given to it another color. We have two colors, the red hue being *another color* than the venous. Two colors, and following this, the blood was yet to become dark. Will now the loss of the oxygen cause a cessation of the red which *superseded* the dark color of the globule, and the blood by that loss become venous? If you had attained your red color legitimately, according to the facts, or rather as it occurs in fact, which is by avoiding all imagining of putting in another color by means of the oxygen, and recognizing the fact that the red color is not *another* color, but only a change in one and the same color, for the time being, ensuing upon the access of oxygen to that color—the true answer to this question would be yes, representing the exact fact of the case. But your supposition is precisely the contrary, and you cannot give that answer without renunciation of it. More than this, your answer is already made, in your pretended *knowledge* that the darkening of blood arterialized is due to carbonic acid. Hence, if the return to dark color be not due to *loss* of oxygen, and simultaneous with it (since the dark is a positive *production* by carbonic acid), the carbonic acid communicates or gives *another* color than the arterial red to the globule, precisely as elsewhere the oxygen just before gave, *in* the red, a color superseding the dark. Your carbonic acid, as you everywhere say, puts an end to this scarlet, by giving

the dark. We are now at the state ensuing upon which oxygen changes the dark into red. We have thus alternate productions of color by the oxygen and carbonic acid, each in turn destroying and superseding the other, which in turn is destroyed and superseded. While neither of these colors are confessed to be that of the globule itself. They both renounce the idea that the color of the globule ever appears in itself.

Either of these colors is put out by the advent of the alternate, enacted by the supposed advent of the carbonic acid putting out the arterial hue, and the oxygen the venous hue. These are the two changes of the color of the blood. It is hardly necessary for us to make any further exposure of these errors. Their very existence is dependent on the supposition that the dark color of the blood is due to carbonic acid. This precludes recognition of the truth that the dark color is not due to any enactment of carbonic acid, but being the color in which the arterial change occurs, is not thereby precluded from constant reappearance while the change is not in progress. And from what we have said, it is both plain and certain that we must either deny it color in itself, or confess that its color is outside of it, and only *in* when the oxygen and carbonic acid respectively are in it.

One word more, about what we call a change in color. It is, indeed, most obvious that the very designation of these two colors, both produced as supposed, is erroneous. By change we mean no such thing as this. What we mean by the term we have sufficiently described. And the only change made in the color of the blood is that we have described. It consists wholly in the access of oxygen to the red globule, and involves no antecedent action on the blood, of carbonic acid. If oxygen lightens the color of the blood by its loss, it will revert to what it was, unoxygenated. This loss of oxygen is especially insisted on in the literature of physiology; but we frequently put the fact out of countenance, by contradicting it in saying that the red globule gives off "carbonic acid;" that it "takes up" carbonic acid; that it "consumes" oxygen, and that "carbonic acid appears in the red globule." All these are confessions of the absence of knowledge, and we say, with the utmost certainty, of the "absence of *mind*," in the authors who make them.

[NOTE ON CARBONIC ACID.—No such event as the transformation into carbonic acid of the separate, simple carbon of the globule and the oxygen from the air in the lungs ever takes place in the blood. No carbonic acid is produced in this way. Nor is there any such destruction of the globule. This is simply Lavoisier's fancied combustion, imagined to occur in another portion of the blood channels from that portion, viz., in the lungs, where he fancied it to take place. And it is an illustration of the confusion on this subject, that all physiologists deny Lavoisier's fancy, yet assume the production of carbonic acid in precisely the same way. The puerile habit of passing with one notion of the

nature of certain phenomena, to a second distinctly different set of phenomena, entertaining one and the same notion of the phenomena comprised in the two sets, from mere lack of any other conception appropriate to the latter, is not exceeded in frequency by any other kind of error. From the incident that carbonic acid is "given off" from the drawn blood in the atmosphere, the notion arises that since oxygen is taken into the blood channels by the globules, carbonic acid is "given off."* But even if this outer event of what results from exposure of an exorganic and post-physiological substance, namely, the exhalation from it of carbonic acid, were correctly conceived, it would have no relevancy to the events taking place in animate bodies. The carbonic acid yielded in the first instance does not involve the *consumption* of oxygen, for it will take place where at the time no oxygen has access to the blood. And this exhalation will take place while the drawn blood is becoming red from dark. We actually conceive that this latter phenomenon is in accord with our notion, that carbonic acid darkens the blood, and hence that the other phenomenon—the loss of it—is the loss of the dark color. This is the most singularly egregious and doltish fallacy of this notion.

It especially says, carbonic acid gives the dark color, hence the loss of it is the *return* of the *other* color which preceded it.† This color which preceded it (see our argument asserting that the affirmation of two colors enters into the false notions respecting carbonic acid) is scarlet. But it is everywhere affirmed in the current notion, that this scarlet color is entirely *due* to the access of oxygen to the globule. How then can the *loss* of the carbonic acid cause it? Are the loss of carbonic acid and the access of oxygen synonymous? Is the production of scarlet one and the same with loss of dark color? Can the gain of carbonic acid produce a dark color, and its *loss* a light or scarlet? You say no! And this is true, but into this expression of truth enters a *denial* that carbonic acid *produces* the dark, and so you deny, by the confession of truth in that answer, the entire assumption that carbonic acid darkens the blood. For if this query were put to us, namely, the query whether carbonic acid, its gain, produces a dark color, and its *loss*, as said by

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* Those who maintain this, also maintain the exactly contrary notion, that in the same time and place, involving precisely the same elements, carbonic acid *enters* the globule and darkens it. Thus one and the same author, in one and the same treatise, maintains both that carbonic acid is produced in and given off from the red globule, and that it enters *into* it, or is taken up by it. In the one case it is produced by destructive resolution within the globule of its substance, and in the other enters from without, produced elsewhere.

† Ceases to be dark and lighten is not one and the same thing; ceases to lighten and darken is one and the same. The former involves the access positively of the oxygen. The second is *not* the access of anything, but the evolution or loss of something,—the strict negative of access.

you, a light color, we should say yes! because, *if* carbonic does indeed *produce* a dark color, which is given (at the time it is supposed to darken the blood)—any color—then consistently with this erroneous idea, we say yes. Of course we know our answer yes is *contrary* to the truth and facts, and is erroneous, but this is because it is consistent with your notion, and all *consistent* with that notion is erroneous. On the other hand, we know your answer is correct, because it has no consistency with your notions, and its truth *refutes* them. You say carbonic acid is exhaled, and the *loss* of this, as the blood ceases to be dark, and becomes light in doing it, makes the blood cease to be dark or makes it to become red.

You also say, the *access* or gain of the oxygen causes or makes the blood to be light (entering into this is the import, that in the play of our ordinary notion of two changes of color, we do assume that carbonic acid *gives* the dark as one *of the colors*). But shall we again disprove this notion for the fourth time? Nothing is easier.

Bernard specifically says, that to the comparative *loss* of the carbonic acid in red venous blood is due the continuance of the scarlet hue; *you* now say that to the exhalation of the carbonic acid, or its loss, is due, in the case just before us, the *discontinuance* of the dark hue, and the *advent* of the scarlet hue. This contradiction between these representations, namely, that the *advent* of the scarlet hue, and the *discontinuance* of it, exactly opposite as they are, are both intrinsically involved in our false notion pertaining to the darkening of the blood by carbonic acid. For if the darkening of the blood were really a process of a positive character, enacted by some substance, as the brightening of blood *is* by oxygen, then upon the *loss* of that substance would ensue the return of the antecedent color. The logic is exact. And the fact is true of *one* of the only two substances concerned, or supposed to be, in change of color of blood; but we see in every one of the points entering into the above exposition, that it is not true of carbonic acid, but is true of oxygen. The answers to our own questionings show that the supposition that loss of carbonic acid lightens the blood cannot be answered affirmatively. They show too that to the loss of one of the two substances, *i.e.* carbonic acid or oxygen, both supposed to be concerned in the change of color in blood, is really to be assigned the return to a color which, during its presence therein, was *changed*. And they show that this one substance is not the carbonic acid, but the oxygen.

But to continue our consideration of the subject just now before us—namely, the subject of the lightening or reddening of the blood during exhalation of carbonic acid in the air,—what is this reddening due to? to the loss of carbonic acid? We need not give a new answer to this question. It is due to the access of oxygen, as in all cases of reddening of the blood. In that case, then, if our position be true, the darkening of

blood under the same or similar circumstances must be due to the loss of oxygen. This is the fact. And of it there is experimental illustration. If blood be drawn into a fluid—water for instance—it becomes dark or highly venous. What is this due to? Is carbonic acid made to enter it in the drawing, and to darken it? This certainly cannot be. Carbonic acid is given or exhaled *from* the drawn blood. What can it be due to but the loss of oxygen absorbed from the blood by the water?

Priestly's experiments on "change of color" in drawn blood, are represented as showing that nitrogen, hydrogen, and carbonic will, each and all, change arterial blood to black, and this by *displacing* oxygen. And this representation of his manipulations has been accepted as that of all the elements in the case, demanding no further inquisition, and suggesting no agency whatever not taken account of in the representation. And this by authors who chronicle their belief in the great affinity of oxygen for the globule—their union to the extent of "oxidation," by the oxygen; and on the other hand of the "consumption of" the oxygen by the globule; its "disappearance" therein; its "loss therein," and so on. So implying the closest of relations, even to the extent of supposed fusion of the two; or the giving up the very form and dissolution of the substance *of* the one, to unite in a single substance—namely, carbonic acid, with the other.

Yet in all this, and in each and every element which enters into it, they entirely contradict themselves, and the above representation of Priestly's experiment; so showing an abject indiscrimination or indistinction of the faculties which apprehend, that in the ingestion of phrases or sentences, without involving the realities those symbols represent, from want of a perception of the facts,—they accept or reflect with equal facility the most mutually destructive and opposite of notions, calling these alike truth, and not knowing which from which. Thus presenting to the discriminating mind the fact that what is called knowledge by these fuddled reputed adepts, and what constitutes them very knowing in their own *discriminating* estimation, is a mere chaos of contradictory statements—the knowledge, meanwhile, remaining unappropriated, outside of these forms, and in the phenomena themselves, awaiting proper representation in verbal forms. What constitutes knowledge on my part, or rather what alone makes me a knowing person, is an exact apprehension of the form and character of the aforesaid phenomena in nature. And the sum of all these I have, constitutes my *understanding*, including its basis in my nature, as well as the superstructure of facts. This, which is mental structure, not all the verbal recognition of all the *statements* in the world can make or unmake. We have gone on long enough, calling these statements "knowledge," until our literature confesses itself a mere mesh and jumble of opposing statements, in the midst of which we stand without knowing the truth, deceived into

the belief that we are greatly knowing. The mere statement of the equal admission of these contradictory representations, is itself a demonstration of the truth we state. That this is not knowing on our part, but a *want of knowing*, is proved by the oft-recurring experience, that when we are asked of several contradictory statements of our subject—as for example of that of oxidation in animals—which of these is true? we are obliged to confess, under some form or other, that we don't know. The very question itself *supposes* that confession of *want* of knowledge as an answer. A collection of our pretended explanations would bring most of them under this head of contradictions.

But to return to the representation of Priestly's experiment. What constitutes the whole heart of the experiment *is*, that none of the gases said to displace oxygen, having no affinity for the globule, which would lead to a firmer union with it than oxygen itself, could do so until it *first* made the condition by its readiness to leave the globule. This *dis*continuance of the relation between the two latter is precisely as much provided for in the nature of the case, in the character of the function, as the function itself, of which it is the termination. This function exists for the *purpose or end* of the perfect distribution of the oxygen throughout the blood. It does not exist for itself, as a purpose or end to be *maintained*. The function itself is not the purpose or end of the event. It is only the antecedent of that end. This purpose or end is the delivery or *distribution* throughout the blood channels, hence the oxygen is not held in the globule by any tie or affinity which requires a displacing power to disjoin it from the globule. It is not held in a way that prevents or precludes it going off. Moreover, as in the body it does not form a *compound* with any substance of the globule, it has not become *inert*, or incapable of leaving this connection with the globule, to unite in the ordinary way with materials in the blood-vessels for which it has an *affinity*.

The consideration of this physiological purpose, done by means of taking in the oxygen, namely, the perfect distribution of the oxygen, presents a new assurance of the import of a fact that no such purpose can possibly be subserved by the imagined taking up of carbonic acid by the globule. Carbonic acid will readily leave any substance where it has been produced. But not because solicited by new combinations, or to enter them. It will depart from them in all cases where not constrained to the opposite. Whatever it may be, without its production, the fact of its going off has not the slightest relevancy to the taking of oxygen. Lavoisier supposed the latter to be concerned in the production of carbonic acid in the lungs. In that case, namely, in case of that transaction, there would be a direct relation between the taking in of one and discharge of the other, but not in the case as we now understand it.]

MICROSCOPY OF THE TEETH.

(Continued from page 73.)

BY S. P. CUTLER, M.D., A.S.G., D.D.S.,

PROFESSOR OF CHEMISTRY AND MICROSCOPY IN THE OHIO DENTAL COLLEGE, CINCINNATI; FORMERLY PROFESSOR OF CHEMISTRY AND NATURAL SCIENCES IN THE BOTANIC MEDICAL COLLEGE, MEMPHIS, TENNESSEE.

I FIND I am always treading on somebody's sore toes, consequently I must try and blaze out some new or unfrequented route to travel in, which I hope I have found at last, at least so far as it has come to my knowledge.

I mean the microscopic crystals that make their appearance in specimens prepared from fresh pulps.

When a section is taken from a fresh pulp and pressed between two slips of glass, slightly numerous, fat globules make their appearance, very small, regular, and round. On pressing the glasses closer together, these fat disks are more or less broken up, and running together from larger ones of various sizes, all of which are round, some of them several times larger than the blood disks, possessing strong optical properties.

These globules occupy more or less the whole specimen. What proportion of fat and other proximate principles these globules contain, has not yet been determined.

There is yet much to learn concerning the chemical equivalents of the pulp. After a time there begins to flow out from the specimen minute streams or currents, drawn out from the fluid elements by capillary attraction of the surfaces of the glasses, and by pressure combined. The size of these streams are governed by the relative spaces between the glasses.

These currents flow out in all directions, crossing each other variously, sometimes continuing in straight lines, sometimes in curves, forming a complete reticulated structure, beautiful in the extreme, presenting, after a few days, a cell-like or buccated appearance, something like fibrin treated with twigs when coagulating.

In some instances, at the terminus of some of these streams perfect links or beads in contact, form themselves into coils of unusual beauty and interest as microscopic specimens. In some instances, clusters of these small bodies collect at the ends of short and rather broad streams, resembling cauliflower—some groups larger, others smaller. These small bodies are perfectly regular, generally slightly oval, and flattened.

In these specimens, portions of the system of nerves of the pulp and the openings through the pulp membrane may be seen.

No crystals are to be seen in these currents or secondary formations, but in them have we not a typal of histology in apparent cell-structures, from the vital forces of the proximate principles that are not yet extinct at the time of these formations?

In specimens properly prepared, after a certain time numerous crystals form more or less extensively throughout them. Sometimes they form only around the border of the specimen, shooting out in a radiate or stellate form, sometimes from certain points from a dark centre. In such, fewer crystals are observed throughout the specimen.

In some scattering ones may be seen just outside of the specimen; fusiform in shape in some instances, in others only one end is pointed, the other presenting a broken appearance.

The crystals that form in the specimen itself are generally in the form of double bundles, branching out from near the centre, and at each end in fine acicular forms resembling almost exactly the crystals of stearin and margarin; and those of the glyco-cholate of soda of the bile presenting the same general phenomena.

These crystals, in some specimens, are scattered extensively throughout, always in isolated groups; in some cases they may be seen in stellated groups, surrounding a dark round centre, sending off very short and fine needles. They are exceedingly beautiful under the microscope. They are no doubt formed from the stearin and margarin of the pulp, and the amount of crystals in each specimen is in proportion to the amount of these elements. These crystals are formed during the desiccation or drying of the specimen, which takes place in the course of a day or two, varying in different specimens.

I do not recollect having seen a description of them by any one.

These would have been described before the ossified pulp, only the subject was not then sufficiently matured to venture an opinion.

In my next article, I will give my mode of preparing the specimen for this purpose.

(To be continued.)

TO REMOVE WAX AND SMUT FROM CASE AND FINGERS.

BY. E. N. CLARK, BELIOT, WISCONSIN.

SOME months since an article appeared in the DENTAL COSMOS giving directions for removing wax from the teeth previous to packing, by pouring hot water from the height of a foot or two upon the case; and another for removing the smut that may get upon the fingers in handling the flask, by rubbing kerosene upon them, then washing.

I have never used either of the above methods, for it seems that water falling in that manner must make some extra spattering; and as to the kerosene, the remedy would be almost as bad as the disease.

My practice has been, after removing what wax we can conveniently with a small-pointed instrument, to place that part of the flask containing the teeth in the water for heating, and when at or near boiling, take a small syringe, keeping the point under the water, pass it round over

the teeth, and a few strokes of the piston removes all the wax, it rising to the surface, when with a wisp of paper it may be removed.

With regard to the smut, sweet oil, which is always at hand, incorporated well with the smut, will permit it to be easily removed by washing in a solution of sal soda, or even with ordinary soap and water, at which time the hands will be left sweet and clean.

ON THE USE OF MORPHIA AS A REMEDY FOR SENSITIVE DENTINE.

BY R. C. MOWBRAY, WARSAW, ILLINOIS.

IN a recent number of the DENTAL COSMOS, a correspondent suggests that sulphate of morphia was recommended *three years since* as a remedy for sensitive dentine, and that its present application is not a new discovery. Without taking space to sustain this position, I will briefly refer to the experience of Dr. Robertson, who used morphia to obtund the sensitiveness of dentine *twenty-three years ago!** And I doubt not other dentists have used it a much longer time.

In my practice I have used it successfully; but I admit with candor it is a different application of morphia than that recommended by the doctor, that pleases me. When placing the morphia in the teeth, I have not at all times found its effect so commendable. It seems to *partially* obtund the sensitiveness of the dentine, but seldom removes it *wholly.* The doctor said he used "from one-fourth of a grain to a whole grain" in a cavity! Is it not better to be on the safe side, and administer this remedy carefully? I have used it for a year past, but I give from one-tenth of a grain to one-fourth of a grain *internally* (*i.e.* the *stomach,* not the teeth), according to the constitution and condition of my patient, and I have no difficulty in filling sensitive teeth, and as many of them as circumstances may direct.

A perfect filling cannot be made for a patient who, at every movement of the operator's instrument, is ready to spring from the chair; yet the fact that a cavity (provided it does not approach the pulp—yet sensitive dentine is by no means confined to deep-seated cavities) having sensitive dentine, when carefully cleaned, rarely gives trouble if properly filled, should incite the profession to seek and use some remedy whereby such teeth can be *painlessly* filled.

The best operators in our profession prefer *complete* anæsthesia, to prevent pain in extracting teeth; for *local* anæsthesia is at best but *partially* effective in a majority of cases, and experience has demonstrated —to me at least—that complete or nearly complete narcotism is the only reliable remedy for those occasional cases of exceedingly sensitive den-

* See "Robertson on Extracting Teeth," p. 72.

tine so unpleasant to both patient and operator. With the present mode of operating our efforts are poorly appreciated when the patient exclaims, "Oh, I would rather have the tooth extracted than have it hurt so!" We do not hesitate to administer anæsthetics to extract teeth painlessly. Why fail to use this narcotic in filling teeth when a patient can escape pain, and the operator can fill with comparative ease? No intelligent member of the profession will deprecate the use of a remedy in the case mentioned more than he would the use of chloroform, or other anæsthetic in cases of extraction.

The younger members of the profession should exercise the greatest care in using this remedy. Remember, "one-fourth of a grain is a narcotic dose for an adult," and avoid using "a whole grain in a cavity" if possible. Harm once done, regrets avail nothing. A large amount of morphia placed in a cavity that is difficult to make retain it, may cause your patient

"To sleep the sleep that knows no waking."

PROCEEDINGS OF DENTAL SOCIETIES.

NEW YORK ODONTOLOGICAL SOCIETY.

BY W. C. HORNE, NEW YORK.

The regular monthly meeting was held February 11th, at Dr. Horne's. Dr. C. E. Francis presiding.

Communications were presented from Drs. J. Taft, of Cincinnati, and J. S. Knapp, of New Orleans, both of whom were elected corresponding members; also from Dr. A. Westcott, of Syracuse, in regard to memorializing the Legislature of New York to establish some standard of qualification, by which all meritorious dentists may be enabled to exhibit to the public a certificate of the skill they may possess; and to require that those yet to enter upon the practice of dentistry shall "pursue a course of study for a time commensurate with the importance of this profession."

The committee appointed to test the working qualities of some fibrous gold, which had been submitted by the manufacturer for this purpose, reported through its chairman, Dr. C. A. Marvin, as follows:

The committee appointed to test and report upon the fibrous gold prepared by C. G. Kearsing & Bro. of New York, present the following statement of its merits:

1st. As to its working properties.

Like foil, it requires a retaining pit or sharp angle for the first pieces, that they may be securely held in place, and keep their position immovably, when subjected to the thrusts or pressure employed in consolidating future additions. This point gained, progress is sure, and not difficult, for its *cohesiveness*, the second working property, is now brought

into requisition. This is of a high order, and may be relied on with certainty. It is not of that peculiar character which might be termed *sticky*, as though its surface were covered with gum, or the tips of its crystals or fibres had been dipped in molasses, but rather of the order designated by the word affinity. The particles seem to unite with a perfect cordiality, and the blending leaves nothing to be desired in this direction. No line or point of union is discernible. What were separate pieces have lost their individuality, as separate drops of liquid lose theirs when put together in a vessel. Next its *adaptability*. Obediently and with no hesitation it takes the place the operator designs it to occupy. But little force is necessary to press or drive a piece to its corner, and when a pit or angle or undercut is prepared for it, it remains in place readily, is easily detached from the instrument, and retains the form given it by the last stroke. This is an important feature. It is excessively annoying to see a piece of gold spring back when the instrument is removed from it, thus rendering necessary the employment of a second instrument for holding it in place. The fibrous gold behaves not thus badly. Like a well-trained "subject" of a psychologist, who holds an arm, leg, eye, the head or body, exactly where and as the master places, nor moves it till he has touched it with his magic hands, so this gold shows no rebellious spirit, indeed no active spirit at all, but passively yields to the indications of the well-skilled hand, and remains as it is left. On this point, of force, that I may not be misunderstood, let me further say—too much force on the first pieces introduced can be employed, and injury results. Sufficient force to adapt the first piece well should be expended, but not enough to thrust the instrument through the mass, dividing its particles and breaking up its unity. Care is required in this particular with this gold as with all similar forms of the same metal. When a foundation is laid, and sufficient thickness gained to remove all fear of such a result, then let no operator spare his arm. Great care is also necessary in finishing next the walls of the cavity. It is just here that most of the failures with crystal, plastic, or fibrous gold occur. The edge is not made solid. There is more danger of leaving the filling in a condition favorable for *crumbling* at the edge than at any other point. Fibrous gold affords no exemption from this danger, nor, in my judgment, does it increase it at all. With careful observation of its properties, and the peculiar mode of manipulation best adapted to them, absolute certainty can be felt as to results, that they will be good—that centre, surface, and edge may be equally solid, equally unified, equally enduring.

2d. Its *solidity*.

The experiments with the specimen of fibrous gold placed in my hands were made with special as well as general scrutiny. By this I mean, that in inserting a very large filling in a lower molar, the intro-

duction of the gold occupying an hour, I watched its operation with reference to *special* properties in turn. I have spoken of them thus far in the order in which I observed them. After noticing the need of a retaining pit or angle, its cohesiveness, its adaptability, its need of care lest its particles should be separated by too much force, and the necessity of great pains while packing and finishing at the walls, I next gave particular attention to its *solidity*. In this respect it is not a whit behind any preparation of gold with which I am acquainted. There is a peculiar feeling inspired by the packing of fibrous gold. When a piece is consolidated upon the previously inserted mass, the entire absence of springiness or any disposition to yield under the point of the instrument, produces an instant conviction in the mind that permanence is there, and the condition of solidity is as certainly recognized as though, personified, it should present its breast to the pressure, and say, "Strike, I am able to endure."

It remains but to consider the *finish* or *surface* which it is susceptible of receiving.

As its solidity is so complete, a smooth and glossy surface can be secured with little trouble and no uncertainty, provided sufficient gold has been built on to allow all the instrument marks to be removed with the file without cutting the tooth. It does not granulate under the file, but resembles the end of a block of gold sawn in two. It takes a fair polish quickly, a fine one by the use of the ordinary polishing substances, and with no great expenditure of labor or time.

This report, Mr. President, is based solely on the single box of "fibrous gold" which I have tried. If that which is hereafter supplied us shall possess the same properties and be equally and uniformly excellent, I shall not regret the favorable report which I now present; but if, as is often the case, it should deteriorate, and present indications of haste and carelessness in its manufacture, I shall claim the privilege, notwithstanding the favor with which I now regard it, to recall my approval and record a caution against it.

Dr. Northrup regarded the article under consideration as equal to any form of sponge gold now in the market, or that he had ever used. He believed it to be pure, and well adapted to building up badly-decayed teeth.

Dr. Hurd united in the good opinion expressed in the report.

Dr. Bogue said—Since May last I have used in my practice about four ounces of Morgan's plastic gold, and nearly as much more of Johnston & Lamm's.

These different varieties of gold are variously marked, but apparently all crystalline forms. Gold is susceptible of being produced in crystals of varying sizes, lengths, and forms, from hexagonal prisms, joined at the edges, to long, fibrous, and interlocking ones; and also of being produced

with a union of all these different forms in the same specimen, and as a matter of course the larger and coarser the crystals the harsher and harder the material, viewed as a plastic material, since it requires more force to bend a larger than a finer or smaller piece of metal. But this coarser material has its manifest advantage likewise in the greater power of coherence possessed by these same larger and longer crystals, which, interlocking their fibres among each other, produce at the same time this greater coherence not only, but also greater hardness.

The finer crystallized gold, on the other hand, is soft, pliable, cohesive to a large degree, yet not so strongly so as the coarser varieties, and requires consequently finer-pointed instruments, with shallower serrations, to work it to the best advantage. It is not coherent under water in any degree favorable to its being so used; on the contrary, however well consolidated, and however well burnished on the surface, fillings put in damp have a sandy, granular sort of texture, which seems inseparable from all forms of precipitated gold, and which in those cases is so strongly marked a characteristic as to leave large room for doubt of their permanence. When put in dry, it is, like other gold, susceptible of being welded at common temperatures, and its soft and plastic character fit it peculiarly for nice adaptation to the walls, and especially the edges of the cavity, but in this exposed situation it requires far greater care in packing than foil. Unlike the old forms of crystal gold, it works easily to the shape of the cavity, condensing *straight* under the pressure of the instrument, and showing no disposition to cohere so strongly as to cause the edges of the piece being packed to curl up toward the packing instrument, yet forming a tolerably solid mass, that can be filed and polished beautifully, showing throughout a uniformity of texture seldom seen in foil fillings. By means of this gold an expert in its use is able to save from one-third to one-half of the time usually consumed in inserting the gold, and a little time in finishing, owing to its greater softness; but let it not be imagined that time is to be saved in the careful preparation of the cavity or the mouth, or even in the manipulation of the gold itself, until one has become accustomed to its use; otherwise we may expect signal failure, and in stating the causes of such failure, the disadvantages of this form of gold become manifest. For example, this gold does not become *solid* without *thorough* packing, though it does become *hard* with but little pressure; and inasmuch as "gold is gold," it takes both time and force to bring its separated particles into absolute contact, so as again to make a solid; and when this is done at common temperatures, we must probably expend as much force as would be evolved by just the amount of heat requisite to solidify it through liquefaction. Unless, therefore, great care is taken to pack the edges carefully, they will be left porous and easily permeable by fluids, and of course the eventual result will be discoloration and decay around the edges, even though the filling appear well externally.

Coherence being very desirable in the gold we use for filling, we seek that quality, often forgetting that, according to the law of compensation, there is no unmixed good; and this very quality causes the "choking" in corners and against edges, that so often prevents the instrument from going to the bottom of the difficulty, thus leaving portions of the plug uncondensed. This is a point to be carefully guarded against in the use of this form of gold. In building out it is extremely useful, yet when we have an apparently perfectly condensed filling we can break it like stone; it does not bend materially, but it breaks, leaving a granular fracture, showing that whether gold be by nature a homogeneous mass or not, it possesses crystalline possibilities, and when in this form it partakes of the frangible nature of all other crystals.

Dr. Marvin, by appointment, read a paper on "Temporary Fillings."*

At its conclusion, Dr. R. K. Browne presented his views on the character and contents of the Dentinal Tubules.*

The subject of Dr. Marvin's paper was laid over to the next meeting, the hour of adjournment having arrived.

ST. LOUIS DENTAL SOCIETY.

REPORTED BY DR. G. A. BOWMAN, ST. LOUIS.

THIS Society held its annual meeting January 10th, when the following officers were elected for the ensuing year:

President.—Dr. W. H. Eames.

Vice-President.—Dr. Isaac Comstock.

Secretary and Treasurer.—Dr. G. A. Bowman.

Executive Committee.—Drs. Isaiah Forbes, Homer Judd, H. S. Chase.

The retiring President delivered an address, embracing the history of the Society from its origin.

The subject of discussion for the evening, DISEASES OF THE ANTRUM, was then taken up, and Dr. H. S. Chase made the following remarks:

There are many diseases of this cavity with which the dentist has little to do, yet as some of them are intimately associated with those of the teeth, it behooves us to pay them that attention which becomes intelligent and skillful practitioners of a liberal profession.

The affections of this cavity may be divided into two general classes, namely, those which originate in the cavity itself, and those which begin in other parts and transfer their diseased action and products to this sinus.

Simple inflammation of the lining membrane is produced by a variety

* These will appear in the next number.

of causes, none of which are more common than that of "taking cold." It is also produced by blows on the face; for we may remember that the walls of this sinus are very thin, in some places not thicker than writing-paper.

At first there will be congestions without pain, then a dull pain supervenes on an increase of inflammation, and finally a discharge of mucus from that side of the nose, more especially on lying down; for it must be remembered that the opening into the nose is high up, and there may be a large accumulation of mucus or other products before it can find exit, unless a horizontal posture is assumed. There will also be dull pain on pressure of the antral walls.

If there is general *catarrh* of the nasal cavity, that of the antrum may not be suspected, which is of no particular consequence, as the remedies are the same for both conditions.

In diseases of this cavity we must not be too ready to lay the blame on a tooth which may unfortunately have sent its roots into the antrum, and which will be affected by inflammation of the latter. Its pericementum may become inflamed, and the tooth be tender to the touch, and in fact have all the symptoms of pure pericementitis.

Here again the same remedies will prove useful for both diseases. For a cure of the antral cavity will probably produce resolution of the pericementum.

We know that pericementitis is often a cause of simple inflammation of this cavity, because the roots of the bicuspids and molars are often exposed in the antrum, being merely covered by its lining membrane.

There is not much danger if we make a false diagnosis, because we would not extract the tooth at any rate; and we have already seen that the same remedies will be used for either condition.

The treatment should begin with two or three doses of aconite, followed by "mercurius vivus, 3d dec." With these remedies I feel confident of a speedy cure.

It is often the case that you will not see the patient until the disease has become chronic. If he lies on the affected side, the mucous secretion would accumulate until the cavity was full, and would then only run over, still leaving the sinus filled. We must remember that this opening from the nose into the antrum, although so large in the prepared skull, is very small in life, with the mucous membranes inflamed and swollen; and in fact it may be entirely closed by this congestion, so that no fluid can find exit. What is the consequence? Why, the contents become putrid from decomposition, and still greater inflammation succeeds. The antral walls give way, and we have an antral abscess opening under the cheek and above the teeth simulating an alveolar abscess, or it may point outside of the face, and an unpleasant fistula be formed, leaving a scar.

If consulted in season, the antrum should be pierced through its thin walls between the roots of the first and second molars.

Almost any instrument will suffice for the operation, and there is no danger in it, for there are no vessels to injure, and no hæmorrhage need be feared.

After the contents of the sinus are lost, the latter, should be thoroughly syringed with warm, clean water, once a day, until the disease is cured; one or two drops of creasote will be found useful in the last injection. As the cure progresses, that terrible stench, which has proceeded from the antrum, almost unbearable by the patient, and disgusting to the doctor, will pass away, and entirely cease when the cure takes place.

Syphilitic diseases affecting the nose and fauces often diffuse their baneful influences to the antrum, either to its walls or lining membrane. The turbinated bones become necrosed or carious, and there is a similar insufferable fetor.

Mercury will be found useful here as a constitutional remedy; also iodide of potassa and chlorate of potassa, and creasote water as an injection.

Mercurial poisoning produces symptoms, in these parts, not to be distinguished from syphilis. Of course the remedy for this condition must be very different.

Mercury must not be used, but iodine and potassa have been found most useful.

We have sometimes alveolar abscess pointing into the antrum, instead of taking its usual course and discharging its contents through the gum. This purulent fluid will, of course, produce similar symptoms to those already described, and we must be careful in our diagnosis. We may penetrate the antrum to evacuate its abnormal contents, as already described. I hardly need to say, *never sacrifice a tooth for this purpose.*

At the risk of being thought tedious by some, I wish to say a few words about the TUMORS OF THE ANTRUM.

These are of frequent occurrence. The most of them are not malignant, but even those considered benign produce very unpleasant and dangerous results, if their development is extreme.

The antral walls are sometimes burst asunder, or very much expanded. The teeth are forced from their sockets, or much separated.

Some of these tumors are mere cysts; others are harder, bony or cartilaginous, and some cancerous.

Those attracting the practitioner as the product of dental disease are the cystic and cartilaginous.

Both of these are oftener the result of irritation proceeding from the roots of the molar teeth, than probably from any other cause. These roots, protruding into the cavity, become affected with pericementitis

from a variety of causes. Continued inflammation causes a growth of the pericementum into a sac, which continues to enlarge until it nearly fills the antrum. Pus is differentiated from its interior surface-cells, and these, becoming gradually inspissated, we have at last a cherry-looking mass within the sac, devoid of any vessels whatever. This kind of tumor is of quick growth; two or three months sufficing to fill the antrum with the substance.

The walls of this cavity become exceedingly thin from the continued pressure inside, and if you find the tooth which is causing the trouble, you will find it very loose, and on extraction will observe that the alveolar walls have been absorbed, and the roots protruding their *whole* length into an open cavity of the antrum. There will be considerable hæmorrhage, for the arterial radicles are numerous and large in the walls of the sac, and when it is torn away the bleeding from the vessel which supplied them will pour out a large stream of blood. The antrum must be packed with lint, wet with such hæmostatics as are preferred,—phenate of soda, persulph. of iron, tannic acid.

In this disease the pain goes on from bad to worse. The ordinary pain of pericementitis is felt at first, but as the tumor grows, there is a pain from pressure like that of alveolar abscess. In fact, this disease would have been an alveolar abscess if the pus which was formed had discharged through the alveolus instead of into the antrum.

Extraction of the offending tooth is the proper remedy, and the tumor will come away with it.

The fibrous tumors are white and cartilaginous in appearance, without blood-vessels of any size to speak of. They grow from the irritation of a dead tooth, and are formed, many times, from the pericementum itself, the connective tissue cells of the latter being proliferated in abundance, and forming a *solid* mass, instead of a cyst, as before described. These grow to enormous size, displacing the teeth and the bones of the face, if not extirpated in season. They are easily removed, and with little danger, for it is well known that the maxillary bones bear operations remarkably well. The surgical experience of the last war has proven this.

Some fibrous tumors are loose and spongy, looking like successive folds of the pericementum; on a small scale we see them at the ends of teeth with "ulcerated roots." But these sometimes continue to grow into enormous masses and fill the antrum, the floor of which has given way to the advancing tissue. This kind of tumor is better supplied with blood-vessels than either of the former, and the hæmorrhage may accordingly be more severe on removal.

Dr. H. Judd—The remarks of the gentleman who has just taken his seat leave but little to be said upon the subject of dental diseases, so far as a general description of their symptoms and pathological conditions is concerned, but I desire to call the attention of the Society for a

moment to some of the common doctrines concerning one of these maladies described by authors as "mucous engorgement, or dropsy of the antrum." It is the doctrine of nearly all authors who have written upon this subject, that this disease is produced by a closing of the opening that connects the cave of Highmore with the middle meatus of the nose; that this opening being closed, the secretion of the mucous membrane of the antrum necessarily collects in and fills up the cavity, and then the pressure exerted upon the walls of the cave, and the irritation or inflammation engendered by the decomposition of the pent-up mass, suffice to explain the subsequent phenomena. That the pain, swelling, etc. in the region of the antrum is caused by the distention of the central walls, decomposition of mucus, etc., perhaps no one will deny; but that the cause of this engorgement is found in the closure of the naso-antral opening is exceedingly doubtful. In cases of chronic catarrh of the nasal passages, it is well established that this opening is frequently closed by the hypertrophied mucous membrane, and remains so for months without any symptoms of mucous engorgement of the antrum having been manifested, and without any extension of the inflammatory action in the lining membrane of this cavity. This doctrine already referred to relating to the cause of this engorgement follows as a corollary from the common doctrines that have come down to us from an earlier age, respecting the function of the mucous membranes, viz., that, in the normal condition, mucous surfaces secrete mucus; but as it is now pretty well established, as set forth by Chambers, of London, and Buhl, of Munich, that mucus is a product of a pathological action, and that mucous membranes in the normal condition only secrete a sufficiency of fluid to lubricate their surfaces, this doctrine of the causation of engorgement of the antrum becomes untenable, and we must attribute it to irritation or inflammation of the lining membrane of the cavity, and direct our remedial agents accordingly. It might be supposed that foreign bodies would often find their way into the antrum from the nasal passages, thus producing irritation and finally inflammation. But a moment's reflection would disabuse us of this notion were it not contradicted by the experience of every practitioner who has given it any attention. In the first place, the current of air in its way to the lungs through the nasal passages passes mostly through the inferior meatus, and consequently nearly all particles of dust, etc. that are drawn in with it, pass along this meatus and do not pass by the opening into the antrum, which is found in the middle meatus; and then the small opening into the cave is studded with ciliated epithelium, and its myriads of cilia are so many tireless, active sentinels, which beat back all intruding motes or particles of dust that would enter this narrow gateway. Desiring only to call attention to these points, I will not occupy the time of the Society by going into a history of the treatment of these diseases, which can be found in detail in nearly all of the recent works upon dental surgery.

PENNSYLVANIA COLLEGE OF DENTAL SURGERY.

THE twelfth annual commencement of the Pennsylvania College of Dental Surgery was held at the Musical Fund Hall, Philadelphia, on Saturday evening, February 29th, 1868.

The valedictory was delivered by G. T. Barker, D.D.S., Professor of Dental Pathology and Therapeutics.

The number of matriculants for the session was seventy-eight.

The degree of D.D.S. was conferred on the following graduates:

NAMES.	RESIDENCE.	THESIS.
Benjamin Arango	Cuba	Caries of the Teeth.
W. H. Barrett	Pennsylvania	Inflammation.
Wm. M. Beardslee	Pennsylvania	Irregularities of the Teeth.
Edward Bedloe	Pennsylvania	First Dentition.
Yldefonso Bravo	Cuba	Salivary Calculus.
A. F. Davenport	Massachusetts	Etiology.
Charles O. Dean	Ohio	The Fifth Pair of Nerves.
T. Gonzalez	Cuba	Operative Dentistry.
Richard A. Gordon	Cuba	Diseases of the Antrum.
Emory J. Greene	Pennsylvania	Filling Teeth.
William W. Hoffman	Pennsylvania	Rise and Progress of Dentistry.
Nelson J. Haines	Maine	Neuralgia.
Canby Hatheway	B. America	Diseases resulting from Caries of the Teeth.
Isaac H. Levy	Pennsylvania	Anæsthetic Agents.
Estanislao Martinez	Spain	Inflammation.
W. R. Millard	New York	Therapeutics.
Thomas T. Moore	S. Carolina	Peridental Membrane.
A. M. Myers	New York	Dental Pulp.
E Henry Neall	Pennsylvania	The Preservation of the Teeth.
Theophilus L. Neff	Pennsylvania	Dental Hygiene.
Elihu R. Pettit	Pennsylvania	Anæsthesia.
George C. Pierpont	New Jersey	Caries of the Teeth.
Fred. Swartzlander	Pennsylvania	Mineral Plate and Block Carving.
P. T. Smith	Iowa	The Skin.
W. H. Stilwell	Ohio	Filling Pulp Cavities.
Charles S. Stockton	New Jersey	The Circulation of the Blood.
Samuel D. Strohm	Pennsylvania	Diseases of Dentition.
Emile De Trey	Switzerland	The Filling of the Teeth with Gold.
Joseph E. Valentine	Pennsylvania	Vulcanite as a Base.
Charles J. Watkins	N. Carolina	The Extraction of Teeth.
John M. Whitney	Ohio	Anatomy of the Human Eye.

Graduates who have been in Practice since 1852.

S. W. Sine..................Pennsylvania. | J. W. Little, M.D..............N. Hampshire.

PHILADELPHIA DENTAL COLLEGE.

THE fifth annual commencement of the Philadelphia Dental College was held at Concert Hall, Philadelphia, March 13th, 1868.

The valedictory was delivered by J. H. McQuillen, M.D., D.D.S., Professor of Institutes of Medicine.

The number of matriculants for the session was forty-four.

The degree of D.D.S. was conferred upon the following graduates by R. Shelton Mackenzie, D.C.L., Secretary of the Board of Trustees.

NAME.	RESIDENCE.	THESIS.
David W. Averill	Wisconsin	Inflammation.
Juan Garcia Bastida	Cuba	Salivary Calculus.
Carlos Baron	Cuba	Mechanical Dentistry.
John Henry Carter, Jr	England	Mechanical Dentistry.
Diedrich Albert Claus	Germany	Abscess.
Richard C. Dawkins	Kentucky	Filling Teeth.
Eduardo Duval	Cuba	Vision.
J. Lehman Eisenbrey	Pennsylvania	Fifth Pair of Nerves.
Charles T. Frink	Massachusetts	Odontalgia.
Edward L. Hewitt	New Jersey	Treatment of Dental Caries.
Richard Ker	Pennsylvania	Strabismus.
D. A. L. Laverty	Pennsylvania	Inflammation.
James F. Love	England	Dentition.
William L. Maxton	Pennsylvania	The Practice of Dentistry.
Jacob B. Morgan	Iowa	The Reparative Process.
George W. Oby	Ohio	Dental Prosthesis.
Joel E. Slegel	Pennsylvania	The Qualifications of the Dentist.
Albion P. Stevens	New Hampshire	Dental Caries and its Treatment.
S Porter Shaw	Pennsylvania	Importance of Saving the Teeth.
Robert R. Underwood	Pennsylvania	Circulation of the Blood.

MISSOURI DENTAL COLLEGE.

The annual commencement exercises of the Missouri Dental College were held at O'Fallon Hall, St. Louis, on the evening of Wednesday, the 26th day of February, 1868, when degrees were conferred and a valedictory address delivered.

The regular graduates of the institution for the session were John R. Matthews, Alfred C. Sloan, and Wm. L. Thomas.

BALTIMORE COLLEGE OF DENTAL SURGERY.

The twenty-eighth annual commencement of the Baltimore College of Dental Surgery was held at the Concordia Opera House, Baltimore, Maryland, on March 12th, 1868.

The valedictory address was delivered by Henry R. Noel, M.D., Professor of Physiology.

The number of matriculants for the session was sixty-nine.

Professor F. J. S. Gorgas, Dean of the Faculty, announced the graduates and conferred upon them the degree of Doctor of Dental Surgery, the names of whom are as follows:

Newton M. Burkholder, Benjamin F. Cosby, Robert T. Couch, Charles G. Edwards, Charles W. Harris, George T. Harris, John Keys, M.D., Alexander L. O'Brien, John D. Scott, M.D., George A. Sprinkle, and W. Leigh Burton, of Virginia; Edwin Z. Buchen, Edward C. McSherry (president of the class), of Maryland; William S. Carruthers, Langston J. Goree, of Texas; David N. Crowther, and Basil M. Wilkerson, of Alabama; John W. Holt, Wm. B. Murphy, and John F. Setzer, of North Carolina; Edwin W. L'Engle, and George A. McIntyre, of

Florida; Albert S. McLeod, of South Carolina; Rufus H. Reeves, of Tennessee; Reuben B. Weiser, of Illinois; Edgar McClintock Williams, of West Virginia; and Thomas J. Thomas, of Cuba,—the latter, on account of illness, being represented by proxy.

EDITORIAL.

TISSUE PAPER AS A STYPTIC.

In operating on the approximal surfaces of the teeth, it is not an unusual thing, if the cavities are near to, or at the margin of the gum, to wound the latter with an instrument, even under the most skillful manipulation. The hæmorrhage, although very slight, proves quite annoying, particularly if a portion of the filling has been introduced, for the slightest admixture of blood with the gold would mar the integrity of the operation. Under such circumstances, tissue paper (previously rolled in small pellets, and placed convenient to the hand) applied to the wound, before the blood has had time to start, will be found a valuable and generally reliable hæmostatic. J. H. McQ.

BIBLIOGRAPHICAL.

Canada Journal of Dental Science.—A monthly magazine, with the above title, will be started in Canada on the 1st of May, 1868, as the representative of the progressive party in the dominion. We wish the editors and publishers every success in the laudable effort to elevate the professional standard in that region. Those desiring further information with regard to it can address Dr. W. George Beers, 11 Beaver Hall Terrace, Montreal, Canada.

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Deutsche Vierteljahrsschrift fur Zahnheilkunde. Redigirt von Ad. zur Nedden, Zahnarzt in Nurnberg. Januar, April, Juli, October, 1867, Januar, 1868. Five numbers of this mazazine—the *German Quarterly Journal of Dental Science*, and the organ of the Central Society of German Dentists, edited by Ad. zur Nedden—have been received. The table of contents in all of them give evidence of the fact that our professional brethren in Germany are awake to their true interest, and are contributing liberally to its literature; in addition to a large number of original communications, copious translations are presented of articles in the American and English magazines. The Dental Cosmos, in particular, has evidently attracted the favorable opinion of the editor, judging from the space which he accords to it. J. H. McQ.

PERISCOPE OF MEDICAL AND GENERAL SCIENCE IN THEIR RELATIONS TO DENTISTRY.

BY GEO. J. ZIEGLER, M.D.

On Digestion. By DR. LETHEBY.—"The phenomena of digestion are altogether of a physical and chemical nature; there is nothing whatever of a vital quality about them; for the comminuted food is brought successively under the influence of special solvents furnished by the saliva, the gastric juice, the pancreatic fluid, the biliary secretion, and the intestinal mucus; all of which are associated with a large volume of water. Digestion, indeed, as Berzelius remarked, is a true process of rinsing—the amount of fluid secreted into the alimentary canal, and again absorbed from it, being, according to the researches of Bernard, Bidder and Schmidt, not less than three gallons in the twenty-four hours. The following, in fact, are the daily proportions of the several secretions and their solid constituents:

	Lbs.	Grs. of solid matter.	Grs. of active principles.
Saliva	8·54	231	87 of Ptyalin.
Gastric juice	14·11	2960	816 of Pepsin.
Pancreatic fluid	8·82	6172	778 of Pancreatin.
Bile	8·54	1283	1078 of Organic Ferment.
Intestinal mucus	0 47	46	28 of Organic Ferment.
Total	80·48	10642	2227 of Special Solvents.

All of which, by their special solutive actions on the several constituents of food, rob it of its nutritive quality, and carry it into the circulation.

"Each of the fluids, so largely secreted into the alimentary canal, has its special functions.

"The *Saliva*, which is a secretion from many glands opening into the mouth, is a thin glairy liquid, of slight alkaline reaction, except while fasting; and containing about 1 per cent. of solid matter—half of which is a peculiar organic body, called *ptyalin*, and the rest is composed of chloride and phosphate of sodium, with a little carbonate and sulphocyanide. Ptyalin is a nitrogenous substance, of the nature of diastase—the ferment, which in the vegetable converts starch into sugar, and hence it has been called *animal diastase* by Mialhe, who attaches great importance to it as the principal agent concerned in the digestion of starchy foods—one part of ptyalin, according to him, being capable of converting 8000 parts of insoluble starch into soluble glucose. Saliva has no chemical action on fat, or fibrin, or albuminous bodies—its real functions being to lubricate the food for deglutition, to carry oxygen into the stomach, and to furnish a solvent for starch and tender cellulose. Those animals which feed chiefly on woody matters, as the beaver, have large salivary glands, and provision is made for a prolonged contact of the secretion with the vegetable tissue.

"An artificial saliva may be obtained from seeds which have fermented, and in which the diastase is abundant. *Liebig's Extract of Malt* is an example of this; and Mr. Morson has taken advantage of the discovery of M. Mège Mouries, that the inner layer of bran contains a nitrogenous

digestive principle called *cerealin*, of the nature of diastase, and has extracted it, and consolidated it with sugar, in a preparation which he has named *saccharated wheat phosphates*. Both of these are aids to the digestion of farinaceous matters.

"*Gastric juice* is a secretion from the entire surface of the stomach. It is a transparent liquid, of a pale yellow color, and of a saline and acid taste. It is much heavier than water (sp. gr. about 1020), and it contains from 2 to 3 per cent. of solid matter—about 1·7 of which is a remarkable nitrogenous organic body, called by Schwann, its discoverer, *pepsin*. Its peculiarity is, that in the presence of an acid, it converts almost every description of albuminous and fibrinous matter into a soluble form of albumen, called by Lehmann *peptone*, and by Mialhe *albuminose*. It differs from common albumen in many particulars—it is, for example, more liquid; it is not coagulated by heat, nor by weak spirit, nor by acids, nor by most mineral salts; it is not very prone to decomposition; and it is capable of *dialysis*, that is, of transudation through animal membrane, and, therefore, of absorption, which albumen is not. The digestive power of it is very great, for Wasmann found that an acid liquid containing only one part of it in 60,000 of the solution—that is, about one grain in a gallon—was capable of dissolving meat; and Lehmann ascertained that 100 parts of the gastric juice of a dog would digest 5 parts of coagulated albumen.

"The nature of the free acid in gastric juice is somewhat doubtful; Lehmann, who has frequently examined it, says it is lactic acid, but Schwann asserts that he has often found free hydrochloric acid. It may be that the chlorides contained in the stomach are partially decomposed by lactic acid, especially during the process of analysis, and thus the hydrochloric acid may be accounted for. When the acid is in too large excess, the digestive action is abnormal, and so also when it is deficient; Lehmann states that the best proportion is when 100 parts of the gastric juice is just neutralized with 1·27 of potash.

"Considering the importance of pepsin as a digestive agent, the preparation of it has become a common affair of trade. In France it is obtained from the stomach of the pig by carefully washing it, then scraping off the soft mucous membrane, rubbing it down with a little water, filtering, precipitating the foreign matters with acetate of lead, again filtering, and then precipitating the excess of lead with sulphuretted hydrogen, after which it is allowed to stand, or it is warmed, to get rid of excess of sulphuretted hydrogen; it is then filtered once more, and after carefully evaporating to the consistence of syrup, it is consolidated with dry starch. In this country it is prepared from the stomach of the sheep as well as of the pig, and we have our *pepsina ovis* and *pepsina porci*; besides which, the use of lead and sulphuretted hydrogen are avoided, by precipitating the foreign matter with alcohol, pepsin being soluble in weak spirit. On the lecture-table are specimens of Boudault's pepsin, as well as those of Mr. Morson, of London, Messrs. Turner & Co., and Mr. Claridge, of Warwick, all of which are also in operation, showing their relative digestive powers on animal fibrin.

"The pepsin preparations on the table contain varying proportions of starch, as from 20 to 50 per cent.; but the digestive power of any specimen may be easily tested by putting a dose of the preparation into a small bottle with half an ounce of water, acidulating with 20 drops of hydrochloric acid, and then adding half a drachm of hard-boiled egg

chopped small, or the same weight of lean meat, or 120 grains of the fibrin of blood. On standing in a warm place at a temperature of from 100 to 110, the digestion should be complete in two hours. Tried in this manner, Dr. Pavy found, some time ago, that nearly all the preparations in common use were inert; not so, however, at the present time, for, as you will notice, digestion is proceeding rapidly.

"I am told that the strongest pepsin is obtained from young, healthy pigs which are kept hungry, and are then excited by savory food which they are not allowed to eat; while the influence of it is strong upon them, and the secretions are pouring out in expectation of the meal, the animals are pithed.

"Pepsin, like diastase, is rendered inert by a temperature of from 120° to 130° Fah.; and, therefore, very hot drinks after a meal are hurtful.

"*Pancreatic fluid* is a secretion from the pancreas or sweet-bread. Until recently its true digestive functions were not well determined. It is a colorless fluid of a gravity of 1008 or 1009. Like the saliva, it is generally a little alkaline, and it contains about 1·3 per cent. of solid matter, one-eighth of which is a nitrogenous organic substance of the nature of ptyalin or diastase, and is called *pancreatin.*

"More than twenty years ago, Bernard proved, what Valentin had long before suspected, that the pancreatic fluid was concerned in the digestion of fatty matters; but he fell into error in supposing that its action was to saponify the fat, and to set free glycerin. Here is a specimen of glycerin and of lead-soap, obtained from fat upon which the pancreatic fluid had previously acted, showing that saponification had not been effected. The true action of the pancreatic secretion is evidently to break up the large granules, and crystals, and globules of oil and fat, into myriads of minute particles of from 1-3000th to 1-15000th of an inch in diameter. In this way the fat is emulsified, and converted into a milky liquid, which mixes freely with water, and passes through the tissues of the intestines into the lacteals. We are indebted for this knowledge to Mr. Julius Schweitzer, of Brighton, who, while managing the laboratory of Messrs. Savory and Moore, made a large series of investigations into the properties of the pancreatic fluid, at the instance of Dr. Dobell, who had long been of opinion that its functions were important to certain diseases, and required elucidation. When the fresh pancreas (and best of the pig) is rubbed down in a mortar with twice its weight of hog's lard, it rapidly emulsifies it; and on adding about four or five times the bulk of water, and straining through muslin, there is obtained a thick milky liquid of the consistence of cream, which gradually consolidates. If this be treated with ether, the pancreatized fat dissolves; and when the ether is separated by distillation, there remains the purified pancreatized fat, which is still miscible with water; in fact, when mixed with four or five parts of water it forms the creamy emulsion which is used dietetically and medicinally in doses of a teaspoonful at a time.

"The properties of the pancreatic fluid have been well described by Dr. Dobell in a paper recently read before the Royal Society of London; and it would seem that the fluid has not only the remarkable property of emulsifying oil and fat, and so rendering them capable of absorption, but it has also the power of dissolving starch by converting it into glucose. In this respect its action is like that of saliva, but it is much more energetic; for in its fresh state, one part of the pancreas will dissolve eight parts of starch, and even after it has emulsified fat it will dissolve two

parts of starch. It is, therefore, a powerful agent of digestion, in so far as fat and starch and young cellulose are concerned, but it has little or no action on albuminous substances.

"I am indebted to Dr. Dobell and to Mr. Morson for the specimens of *pancreatin* and *pancreatized fat* upon the table. The first of these preparations is obtained by treating the fresh pancreas with water, and carefully evaporating the solution to the consistence of syrup, and then consolidating it with the flour of malt. Perhaps the dried pancreas, powdered and mixed with malt, would be a stronger preparation.

"The *Bile* is a complex liquid, consisting of biliary acids (*taurocholic glycocolic*, etc.) in combination with soda. Its reaction is slightly alkaline, and it contains about 14 per cent. of solid matter, not less than 12 of which are organic.

"The true function of the bile is unknown; perhaps it aids in neutralizing the acid peptones from the stomach: perhaps, also, in emulsifying fat; and it may be that it helps the digestion of starchy foods. Lehmann thinks it is a rich residuum from the manufacture of blood globules in the liver, and that it is secreted into the alimentary canal, only to be reabsorbed into the blood. Mr. Lee, also, is of opinion, from his examination of the fœtal liver, that it separates a highly nutritious substance from the portal blood, which is elaborated in the intestines. Its functions are evidently obscure.

"Lastly, the *intestinal secretion* which is thrown out along the whole course of the small intestines, is, according to the researches of Bidder and Schmidt, a powerful agent of digestion; for it combines the activity and digestive power of all the other secretions—starch, fat, and albuminous substances being all equally well digested by it.

"The food, therefore, coming into contact with these special solvents, and being copiously drenched with fluid, gives up its nutritive constituents. Admirable, however, as this provision is for the digestion of food, a considerable portion of useful matter passes through the bowel unchanged; for cellulose, starch globules, and muscular fibre are common constituents of sewage. Dr. Lyon Playfair says that in the case of an adult man, with good digestion, 1-12th of the nitrogen of the food passes away with the fæces, and others have computed it at an eighth. In a dry state the fæces of man contain about 6·5 per cent. of nitrogen, and in the fresh state 1·7. In Ranke's experiments, it was ascertained that the nitrogen in the fæces was to that in the urine as 1 to 12·5. Much of this is, doubtless, derived from the secretions which have done the work of digestion and have thus become effete; indeed, Dr. Marcet is of opinion that the alvine discharges are chiefly composed of the residuum of albuminous substances which have been secreted into the bowel for the purposes of digestion. In ordinary individuals they amount to from 4 oz. to 5·5 oz. a day—(Wehsurg says 4·6 oz.; Liebig, 5·5 oz.; Lawes, 4·2 for a middle-aged adult, and 6·2 for a person over fifty—the mean amount for adult males being 4·2 oz., and for adult females 1·3 oz.); and when calculated in a dry state they amount to about 1·1 oz. daily. It would seem, however, that when indigestible and irritating food is used, the quantity of fæcal matter is increased, as if the food was hurried through the intestines without undergoing digestion. At the Wakefield Prison, for example, it was found that when brown bread, containing bran, was given to the prisoners, the weight of the fæces was 7 oz. per head daily; and the same fact has been observed at the Coldbathfields Prison."—(*Medical Press and Circular.*)

"*Animal Electricity.*—To the agency of friction, the amber of the ancients, the chemical action of modern voltaism, the mysterious properties of natural and artificial magnets or loadstones, and that peculiar vital principle inherent in certain animals, are due all the effects generally included in the comprehensive term electricity. If to these primary causes we add those of terrestrial currents and inequality of temperature, we provide, at least in theory, for all those atmospheric phenomena hitherto inexplicable upon any known data. If, as a certain eminent ecclesiastic remarked, 'chance is a word to express our own ignorance,' what a 'chance' electricity must be. It is to the *savant* and the philosopher what 'heart disease' is to the coroner and the faculty. Exactly a century ago galvanism was first discovered, and the term was applied to describe a species of electrical excitation, presumed at that time to differ materially in its origin from all other similar effects. Evidently the cause was referred to some muscular agency, which produced a peculiar sensation or taste when two dissimilar metals were applied, one upon the upper and the other upon the lower surface of the tongue. Sulzer, who made this discovery, ascribed it to some vibratory motion produced in the nerves of the tongue, naturally a highly sensitive organ, and inferior in that respect only to the eye. Galvani, whose name is familiar with the celebrated experiments upon the limbs of frogs freshly killed, more fully developed this theory, and was the father of a new school, which, while recognizing the cause of these post-mortem effects to be connected with electricity, yet affirmed that they were due to some especial modification of that unknown agent, residing solely in the animal system, and consequently bestowed upon it the appropriate name of animal electricity. The celebrated Volta was the first to successfully dispute this view of the subject, and to establish the identity of the origin of galvanic and electric phenomena. Recent experiments have confirmed the theory that animal electricity does not owe its origin to the formerly imagined action of the nerves or muscles, but emanates directly from a purely chemical source, the exciting cause being generated by the contact of the air with the incipient decomposition of the freshly-killed animal. Bearing in mind that a liquid, but very slightly saline, in contact with the animal substance, is an electrometer, it is easy to perceive that the so-called muscular current is nothing more than the current produced by their contact. To put beyond a doubt the question that a live muscle would generate electricity, which it could not produce when dead, contact has been made between the muscles of a live animal and the wires of a galvanometer, without the latter evincing the slightest sign of an electrical current. Moreover, if a portion of muscle be separated from the body of an animal freshly killed, and placed in communication with a galvanometer, a feeble degree of electricity is demonstrated. According to the opinion of a member of l'Académie Française, this is due to the influence of oxygen upon the flesh, a cause always existing when the muscles retain their normal state of irritability. Assuming that animal electricity was due to the cause surmised by Galvani, the evidence of the current would cease so soon as the muscles become completely inert, or, so to speak, completely dead. But the reverse is the fact. The more decomposed the flesh becomes the stronger are the advances of its electrical condition, and when it has acquired a state of almost total putridity it imparts the maximum deviation to the astatic needle. That the presence of a saline liquid is necessary to these elec-

trical effects is proved convincingly by several circumstances. One is, that meat newly salted becomes electrical in proportion to the penetration of the solution, and the other that cured meats, whether beef, pork, or fish, evince a high state of electrical development. The blood of a living animal is altogether destitute of electrical excitation, but becomes capable of affecting the galvanometer as soon as the animal is killed, and its power increases with the putrefaction of the body. A small addition of common salt to the blood immediately increases its electrical sensibility. If the epidermis of an animal be removed, the under layers of cuticle are highly electrical, as experiments upon frogs have demonstrated, and this condition is still further augmented by the addition of a saline solution. From these results we are justified in assuming that animal electricity in its original symptoms is a delusion, and that without the intervention of some slightly saline liquid the nerves and muscles are, *per se*, powerless to afford the smallest evidence of an electrical current. Unless a chemical action can be set up there is nothing to indicate the presence of that vital muscular agency which the first experiments in connection with the subject led the older philosophers to insist upon and adhere to. The animal current, which they so fondly propounded and believed in, is simply an ordinary electrical current produced chemically by the contact of a saline solution with animal matter, in which combination the salt acts the part of the electrometer. Adopting this view of the question, it is easy to perceive that the development of animal electricity, in invalids and diseased organs, instead of being due to the cause originally entertained, is solely the consequence of chemical decomposition. Thus, for instance, the mucous membrane of the mouth becomes electrical in patients suffering under disease of the stomach or digestive organs, and strong evidences of it are manifested in malignant, cancerous, and other ulcers of a dangerous and fatal type. All animal excretions are electrical, and urine possesses this property in so remarkable a degree as to cause the needle of a galvanometer to make a complete revolution on the dial. The electricity of fishes results from an alkaline solution in the cells of the electric organs, and manifests itself very powerfully. All the effects of animal electricity may therefore be regarded as closely resembling those of fermentation and putrefaction, and to depend not upon any muscular or nervous hypothesis, but solely upon an incipient chemical decomposition in combination with chemical electrometers "—(*The Engineer* and *Drug. Cir.*)

Influence of Anæsthetics on Brain and Nervous System.—"DR. RICHARDSON'S fifth lecture, delivered on Tuesday last, was a study of the influence exerted by anæsthetics on the brain and nervous system. The obvious fact that the motion of the heart and the movements of respiration continue in action while the rest of the body is under the narcotic effect, during anæsthesia, proves that the whole nervous system is not involved, and that the involuntary and semi-voluntary muscular mechanism is also not involved except when extreme and fatal symptoms are developed. What parts, then, are influenced by an anæsthetic? The idea was almost intuitive that the brain is the organ affected, and that the centres of consciousness are those chiefly held in abeyance. But, to prove this as true, experiment was necessary. In proof, the lecturer took a large pigeon, narcotized it deeply with chloroform, and in this state passed through its body, from the head to the foot, a rapid inter-

mittent induction current. The bird instantly rose from the table, extended its wings, opened its eyes, and seemed as if restored; the current was then stopped, and the bird was shown to be as deeply asleep and as powerless as before. Another bird was put to sleep by freezing the brain, and when utterly insensible was subjected to the electrical shock in the same way, when it flew from the table into the room, where, breaking its connection with the battery, it dropped on the floor comatose, motionless, and as anæsthetized as before, in which condition it remained for many minutes. The lecturer in these experiments demonstrated that the anæsthetic action was localized in the cerebrum. His battery was like an outer brain, which supplied power without intelligence, and which, by the effects of its current, showed that all the muscular elements were ready for work, and only awaited the order from the brain. The lecturer next discussed the question—What, during the process of anæsthesia, leads to this change in the brain? Is there a chemical action on albumen? Is there pressure on brain matter? Is there deficient oxidation of the blood? Is there contraction of blood-vessels, and diminished supply of blood from that cause? All these hypotheses were experimentally tested and negatived. It was admitted that during extreme anæsthesia there is reduced oxidation and a singular reduction of temperature. These changes are inevitable, because the anæsthetic vapors replace oxygen during their diffusion into blood; but the diminished oxidation is not the cause of the insensibility. In proof of this Dr. Richardson showed an animal breathing an air in which the oxygen was reduced by addition of nitrogen from 21 parts to 9 parts in the 100, side by side with another similar animal breathing on air in which the oxygen was reduced by the addition of vapor of bichloride of methylene only to about 20 parts in the 100, viz., 4 cubic inches in 500. The result was that the animal in the extremely reduced atmosphere was quite unaffected, while the animal in the slightly reduced atmosphere was in the deepest narcotism. Then a correcting experimental test was adopted, and the bichloride was administered in an atmosphere containing an excess of oxygen, the oxygen being present in double its ordinary or natural proportion; the excess of oxygen exerted no perceptible obstacle to the anæsthesia. To determine whether there was contraction of blood-vessels under anæsthetics, the lecturer had had recourse to transparent small trout; through their bodies, with the microscope and the one-inch lens, the blood-vessels could be seen, and the corpuscles flowing through them. These animals can be narcotized readily by making them breathe water saturated with chloride of methylene or ether. In the narcotized condition, the vessels do not contract, but under the influence of ether, in the later stages, before death occurs, dilatation and regurgitation are observed. The latter is noticed also when chloride of methylene is used. With both reagents breathing and vessel circulation cease before the heart's action. The lecturer concluded that anæsthetic vapors act directly upon nerve matter either by preventing the development of force or by stopping conduction. The latter hypothesis is supported by the fact, proved by experiment, that these vapors obstruct the conduction of heat and electricity."—(*Med. Times and Gaz.*)

Microscopic Life.—The Paris correspondent of the *Lancet* gives the following summary of some observations on this subject: "The question of the 'infinitely small' is *à l'ordre du jour*, and the recent re-

searches of numerous investigators would tend to prove that we live amid myriads of animalcules, which infest the air we breathe, the food we take, sojourn in our bodies, are cast out in our breath, in our ejecta, and hover perpetually about us, exercising, perhaps, a certain influence over our state of health or disease. For instance, M. Jules Lemaire, whose name has recently been so often quoted in your columns in connection with the much-vexed question of the employment of carbolic acid—M. Jules Lemaire, I say, has undertaken a series of experiments, in the course of which he has been enabled to discover whole myriads of these little beings in the air which we expire, and in the filth which covers the skin of those who have a natural aversion to soap and water. Thus, M. Davaine, in an interesting memoir recently presented at the Academy of Medicine, and bearing upon the nature of carbuncle, related that in this disease there exist quantities of bacteria in the blood. This fact he had already stated at a former period, but he had not been able to determine whether the bacteria were the cause or the effect of the malady. The results of more recent researches now allow him to specify more precisely 'that bacteria are to be found in all carbuncular diseases, of any form whatever; that the supervention of these little beings in the spleen, the liver, and the blood, precedes the occurrence of morbid phenomena; that carbuncular blood ceases to be contagious as soon as the bacteria have disappeared; consequently, that he is justified in considering them as the cause of carbuncular diseases.' Meanwhile, M. Poulet, another investigator, informs us that multitudes of infusoria inhabit the air which is expired by children affected with whooping-cough. 'The vapor proceeding from the child's breath presented, when examined with the miscroscope, a whole world of little infusoria. In all the cases they were identical. The more numerous, and, at the same time, the smaller of these animalcules, may be classified with the species which has been described by some as the *monos termo*, and by others as the *bacterium termo*. Others less numerous were seen scampering about under the lens.' The observation of these facts led the author to express himself thus: 'Whooping-cough, through the changes undergone by the air which is breathed out, must take its place amid the infectious diseases, among which I have examined from an identical point of view small-pox, scarlatina, and typhoid fever. This circumstance had been already brought to light by mere observation of facts, but examination with the microscope had settled it definitely.' To conclude this little excursion into the world of the infinitesimal, I may just mention the interesting experimental researches which MM. Coze and Feltz, of Strasbourg, have been making on the presence of infusoria, and of the state of the blood in infectious diseases."

Microscopic Parasites.—In the *Chicago Med. Jour.*, Dr. Walter Hay details the interesting researches of Dr. Lemaire, referred to in the preceding, from which we extract the following: "*Mucous Membranes.*—The existence of infusoria in the mucus which rests upon these membranes has been indicated.

"I have collected from several persons, in perfect health, nasal, buccal, pharyngeal, urethral, and vaginal mucus, and bronchial expectoration, and have found in them no infusoria. I have done more—I have preserved this mucus in little bottles corked with emery, in the presence of air, and I have proved that it resisted putrefaction for a much longer time than other organic matters.

"These facts agree with those which M. Robin has observed. This skillful observer remarks that organic matters taken into the normal blood, resist putrefaction more than those collected in marshes.

"After these facts, I am led to believe that the infusoria which have been found in the mucus have been developed under the influence of a pathological state, or of uncleanliness.

"*Mouth.*—I have stated that the existence of bacteria and vibriones had been recognized in the remains of the food, and in the pultaceous matters collected upon the teeth. I will add, that persons having carious teeth and irritable gums, present, moreover, in considerable quantity, spirilla volutantes and monads. There are few adults, otherwise perfectly healthy, who have not some carious teeth, some of this pultaceous matter, and who do not permit some remains of their food to collect between their teeth. It will be understood that those who breathe by the mouth would diffuse through the atmosphere some of these microzoa. It may be demonstrated in the following manner: let the products of respiration passed through the mouth of a man having carious and filthy teeth, be directed upon a vessel filled with ice. The vapor of water driven out from the lungs condenses there. There will be found in this liquid, independently of reproductive bodies of microzoa, bacteria, and vibriones.

"The two bacteria catenala, and the two vibriones, which I found in the vapor of water from the casemate, at the moment of the condensation, originated without doubt from the dirty mouths of the soldiers. As I shall demonstrate presently that the vapor of water exhaled from the lungs contains no infusoria, it is, therefore, in this case, the mouth alone which could furnish them. * * * * *

"Observe how I make this demonstration: I cleanse in advance the entire buccal cavity and the throat with water containing two per cent. of tartaric acid, which kills microzoa.* I then wash all these parts thoroughly with pure water. I experiment in the morning, fasting, in order to avoid the emanations from food, drink, etc., in the following manner: I inspire air through the nostrils, and pass the products of expiration through a tube having a bulb surrounded with ice, avoiding carefully the introduction of saliva. For this reason I hold one extremity of the tube between my lips. Twenty minutes suffice to obtain several grammes of condensed vapor. The liquid, at the moment of its collection, contains fragments of epithelium, some very small globules, and some black grains, also small; these last appear to me to be carbon. This liquid, placed in a flask, stopped with emery, has been examined with the microscope, every two days in summer, during one month. It has never afforded either microphytes or microzoa, and remained limpid. I repeated this experiment ten times. It has always given me the same results. I have preserved this liquid for a year. It has remained as clear as at the first day."

Salivation in Pregnancy.—In a report of unusual obstetric cases (*Boston Med. and Surg. Journ.*), Dr. A. D. Sinclair relates the following of special interest: "*Puerperal Salivation; Puerperal Mania; Death.*—Mrs. ——, æt. 24; second pregnancy. Salivation came on

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* Perhaps a solution of sulphite of lime, or other sulphite, might be as efficient without endangering the teeth.—Z.

early in pregnancy, and continued more or less troublesome to its close; amounting to about a pint in the twenty-four hours. Her general health was about average. The mucous membrane of the mouth was not so abraded and tender as to prevent the use of ordinary diet. It was noticeable, in the course of her pregnancy, that she entertained gloomy notions with regard to domestic affairs: fancied that her boy was badly treated by its father, and that the latter did not care for herself as much as he might, etc.—fancies which were without real foundation, and the cause of much grief to the husband, who was truly devoted to wife and child. This patient was frequently seen during pregnancy, and her condition remained much the same. She was delivered of a child at full term, after a labor of five hours. The salivation ceased, but her melancholy deepened; and soon after confinement she neglected her children and household, sat and brooded over imaginary troubles, spoke but seldom, and that only yes or no. She was sent to an asylum, where she died, imbecile, in a little over two years.

"*Puerperal Salivation; Bronchitis; Diarrhœa; Death.*—Mrs. ——, æt. 26; third pregnancy. During the last three months of pregnancy she had profuse ptyalism, the saliva flowing from her mouth so freely that she was obliged to use a bed-sheet as handkerchief, and not unfrequently was this large surface of cloth completely saturated in the course of a few hours. The mucous membrane of the lips, tongue, and interior of the mouth was denuded of its epithelium. The mouth felt as if it had been scalded, and the use of any but the blandest articles of diet caused much suffering. An irritable condition of the mucous membrane seemed also to extend to the lungs and alimentary canal, for there obtained a troublesome bronchitis and a tendency to diarrhœa. Pulse, generally, over 100. Medical treatment did not restrain the salivation, and had but little effect on the bronchitis and diarrhœa. Labor came on at the full period, and lasted only two hours. It was hoped that the morbid condition, heretofore existing, might cease on delivery. The salivation disappeared and the bronchitis decreased, but the diarrhœa increased, against the arrest of which all efforts proved useless. She died thirty-seven days after confinement."

Syphilis from a Bite.—"*Question of Incubation of the primary Lesion of Syphilis.* By Charles R. Drysdale, M.D., M R.C.P.L., F.R.C.S.E.—The period of incubation of the primary or local lesion in syphilis is a very difficult ascertainment, and, moreover, it seems by no means to be invariable in its length. The admirably-observed case cited by Dr. Robert McDonnell, in the *Medical Press and Circular* of Jan. 29th, 1868, gives the period as thirty-one days. Professor Böeck has told me he has remarked that when inoculation is made from an indurated *sore*, there is little or no incubation in general; while, when a person is infected from a secondary symptom, the period of incubation is often rather long. Baerensprung puts it down at twenty-eight days, and in the cases, now amounting to a considerable number, where blood and other secretions of syphilitic persons were inoculated on healthy persons, the period of incubation of the primary lesion was found to be about a month. The following case of well-marked incubation period was seen by me at the Farringdon Dispensary, Holborn, on the 16th March, 1865. A modest-looking young girl, aged nineteen, came with a remarkably hard non-suppurating sore on her right lower lip. Sub-

maxillary glands were hard. Diagnosis, indurated chancre. The girl was modest and well-bred, and I was at a loss to account for this fact. On inquiry it appeared that she was engaged in marriage to a man, and that one evening, at the beginning of February, he had, on bidding her good-by, bitten her lip playfully in kissing her. She remembered the time well, because the lip was painful after it. Three weeks afterward she felt a lump in the lip, which gradually enlarged until it became the size of a hazel-nut, when she came to consult me. This gave an incubation period of upwards of three weeks, or twenty-one days. I may add that the girl soon had roseola and periostitis of the tibia, and slight alopecia, with mucous tubercles, all of which gradually, though slowly, got well under doses of pot. chlor., and, in about nine months, being free from stains, she married, and became pregnant, after which I lost sight of her."—(*Med. Press and Circ.*)

"*Ranula.*—Mrs. R., of Manayunk, came to consult me for a goodly-sized tumor under her tongue, causing the anterior part of the neck to project considerably. It proved, on examination, to be a large ranula, which had existed for more than a year, and which incommoded greatly the movements of the tongue. A seton was passed through the tumor under the tongue; a good deal of inflammation followed, of course, to the great alarm of the woman, but it had the effect to cause the sides of the sac to adhere, and the tumor to subside entirely, with the exception of a slight thickening of the mucous membrane under the free end of the tongue, which, to a great degree, will disappear. She is very happy to be freed from her annoying and troublesome companion."—(Dr. Thos. F. Betton. *Med. and Surg. Reporter.*)

"*Facial Neuralgia.*—Reported by Dr. Napheys. Surgical clinic of Prof. Gross, Jefferson Medical College. Jane W., aged twenty-eight. She has had pain in the side of the head and face for twelve weeks, extending from the base of the jaw over the posterior part of the neck and head, and over the temple and ear. It becomes gradually worse about two o'clock in the afternoon, and goes on increasing until evening, preventing her from sleeping. It begins to feel easier between eleven and twelve o'clock, but returns at five o'clock in the morning. She has never had intermittent fever. She sweats a good deal at night. Tongue a little coated; appetite not very good; alvine evacuations every day; menstrual function properly performed. She has some decayed teeth; holding hot or cold fluids in the mouth produces pain, as does also chewing.

"In all cases of facial or cervical neuralgia, or neuralgia of the head, the condition of the teeth should be carefully examined. In the writings of Dr. Benjamin Rush, a great man, who has left an immortal reputation, there will be found a very full account of diseases produced by decayed teeth. Among other cases, there is one of pain of a neuralgic character in the nates. Upon the removal of a decayed tooth the pain vanished. Prof. Gross has seen again and again neuralgia kept up by decayed teeth, upon the removal of which the pain disappeared without any medicine.

"The patient was directed to have the affected teeth removed, and ordered ten grains of quinine, morning and evening, until quininism is produced. Small doses of quinine are worse than useless, under such circumstances. Good doses, well directed, will accomplish more than many small ones."—(*Ibid.*)

Remedies by the Nares.—The *Boston Med. and Surg. Journ.* contains a translated article by Dr. Brown, detailing the experience of Dr. M. Rambert in the introduction of remedies through the Schneiderian membrane. The following among other illustrative cases are recorded: "S., a farmer sixty-two years old, had experienced a neuralgic pain in the right side of the inferior maxilla for some months. It had manifested itself in the teeth, the gums, in the lower and right side of the tongue, and had recurred at frequent intervals. He had lost several teeth, without any benefit. The painful points of the gums and the neighboring mucous membrane forming the roof of the mouth and the side of the tongue, were lightly touched with nitrate of silver. After a momentary relief, the pains returned and persisted. They did not yield to a blister applied behind the right ear. The twenty-fourth of February, I caused him to take every hour or every two hours the mixture of powdered sugar and morphia, in the dose of two grammes of the former and ten centigrammes of the latter. The remission and diminution of the pains was very marked. The patient found himself sufficiently relieved not to make use of a new blister, which I had proposed to sprinkle with morphia.

"I learned subsequently, from the pharmacist, that the patient obtained the same mixture of him from time to time, showing that if he was not entirely cured, he was always relieved by it.

"B., nineteen years old, employed in a fancy goods shop, had suffered since the middle of March from a diurnal neuralgia, which attacked the left side of the inferior maxilla, in which several molar teeth were carious. Toward the end of the month, I advised him to use a mixture of five grammes of pulverized sugar and five centigrammes of morphia. He received no benefit from this treatment. The second of February(?) I changed the proportions of this powder, and caused him to take, by each nostril, twice in the middle of the day and twice in the evening, a pinch of two grammes of powdered sugar and ten centigrammes of morphia. The pain disappeared and did not return."

Carbolic Acid for Toothache.—A correspondent of the *Lancet* thus testifies to the value of carbolic acid in odontalgia. "Among the many virtues of carbolic acid is that of giving relief from the pain of toothache. I have tried it in a great many cases, and with invariable success. To one drachm of collodium flexile (B. P. 1867) add two drachms of Calvert's carbolic acid, full strength. A gelatinous mass is precipitated. A small portion of this precipitate inserted into the cavity of an aching tooth gives immediate relief. It may be kept in the cavity by means of a bit of lint dipped in the collodium."

Redevelopment of Teeth.—"At the last meeting of the Odontological Society of Great Britain, which may be considered to represent the dental profession in the persons of its leading members, Mr. Oliver Chalk, M.R.C.S., who is well known to have devoted great attention to surgical strumous diseases, read a paper entitled 'The history of a case of scrofulous necrosis of the entire right half of the lower jaw, with removal, subsequent regeneration, and formation of teeth in the new bone, with other cases of a similar nature.' The object of the paper was to support a view previously promulgated by Mr. Chalk, but opposed by Mr. Tomes and others, that when redevelopment of the maxilla takes

place, as is so frequently seen after the occurrence of necrosis, a new development of teeth is possible. The cases and specimens brought forward in support of this view were four in number, and were examples of necrosis of the jaw in children, with more or less repair of the lost bone, and the subsequent appearance of certain permanent teeth. As pointed out, however, by some of the speakers who took part in the discussion, the subsequent appearance of permanent teeth was no proof of their redevelopment, unless it were conclusively shown that they had been previously shed in an imperfect condition. We can hardly imagine that physiologists will be inclined to coincide with Mr. Chalk's ingenious suggestion of a new development of teeth, but will rather agree with the explanation of the phenomena offered by Mr. Tomes in his 'Manual of Dental Surgery' (p. 75): 'The connection between the walls of the crypt and the sac of the developing tooth-pulp is in the normal state but a slight one; and this in the character of cases referred to, may be rendered still more slight by the presence of disease. Now in the presence of the foregoing conditions it is not improbable that the pulps of the permanent teeth remain attached to the soft parts, while the crypts included in the sequestrum were removed; and, if such were the case, the developing teeth might again be surrounded by newly-formed bone.'"—(*Lancet.*)

Odontomes.—The Paris correspondent of the *Lancet* states that "in a memoir recently presented to the Academy of Sciences, M. Broca describes a novel group of tumors, which he designates by the name of *odontomes*, and which are constituted by the hypergenesis of transitory or definite dental tissues. According to the period of occurrence, the extent and gravity of the alteration which it determines, the disease which affects these organs may destroy or not their normal property of producing the elements of dentification. *Odontomes* may, therefore, remain in the state of soft tumors, or take a dental consistency, constituting in the latter case irregular dental masses of sometimes considerable size. M. Broca divides their evolution into three periods: 1. Formation; 2. Dentification; 3. A state in which dentification is completed, and in which the tumor becomes stationary both as regards its structure and its size."

"*Lancing the Gums in Children.*—Dr. F. H. Thomson (*Glasgow Medical Journal*), believing that the irritation of teething is caused by the engorgement of vessels supplying their circulation, advises the practitioner to cut low down at the reflected junction between the lip and the gum, instead of upon the summit of the gum itself."—(*Med. Gaz.*)

Phenic Acid.—"M. Rust has made known a reaction by which phenic alcohol may be distinguished from the creasote separated from beechwood tar. A mixture of ten parts of collodion and fifteen parts of phenic acid forms a gelatinous mass, while the creasote from beech-wood tar mixed with collodion gives a clear solution."—(*Chem. News.*)

"*Decoloration of Iodine.*—Dr. Baruch, of Camden, S. C., communicates the following to the *Medical Record:* During some experiments on iodine, I recently discovered a fact to which I desire to call the attention of the profession. In the skin department of the Demilt Dispensary,

Dr. Bluxome was (in 1865) in the habit of using tr. iodine, decolorized by liq. ammoniæ. But as this combination appeared so very irritating as to cause children, to whom it was applied for herpes, etc., to scream most violently, Dr. B. concluded to abandon its use rather than inflict unnecessary pain on his little patients. Recently (Nov. 1st), your journal contained a notice of the decolorizing property of carbolic acid on iodine, discovered by Dr. Percy Boulton. This 'carbonate of iodine' is highly praised in a letter to the *Journal des Connaissances Médicale* as an antiseptic and stimulant, and as such it is doubtless a valuable agent. But in some cases the carbolic acid might be contraindicated. I have ascertained that the hyposulphite of soda has the peculiar effect of depriving the iodine of its color, forming a perfectly limpid fluid, which does not form the purple iodide of starch on the linen, nor produce the yellow discoloration of the skin. The hyposulphite having no medicinal effect in the small quantity required for this purpose, the tr. iodine suffers no addition to nor detraction from its therapeutic properties. I make a saturated solution of the hyposulphite in water, and this is added in proportion of about one-sixth of the tr. iodine. The latter floats upon the former, but through agitation will produce a beautifully clear solution with the properties mentioned. The solution of the bisulphite answers the same purpose. If we desire to obtain the effect of the undiluted tr. iodine, we need only dissolve a few small crystals of the hyposulphite, or a little of the powder of the bisulphite, in the tincture, and complete decoloration will be the result."—(*Med. Gazette.*)

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"*Conversion of Gallic Acid into Tannin.*—T. Lowe finds that gallic acid in aqueous solution is converted into tannic acid by the oxidizing influence of argentic nitrate. The oxidation is more complete if a salt of gallic acid is employed."—(*Journ. pr. Chem.* and *Chem. News.*)

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"*On Aluminium*—At the last meeting of the New York Lyceum of Natural History, Prof. Henry Wurtz, well known as the discoverer of the peculiar value of sodium amalgam for amalgamating gold ores, read a very interesting paper on some newly-discovered properties of the metal aluminium, an abstract of which we find in the *American Journal of Mining*, as follows:

"The author's numerous experiments upon metals with sodium amalgam have revealed to him new and surprising properties of aluminium, the most abundant metal (as he says) upon the earth, and promising to be the most valuable. These new phenomena, once discovered, may, however, be readily reproduced without the aid of sodium, and they were exhibited to the Lyceum by Professor Wurtz, repeatedly and in various forms. He first pointed out the wonderfully exceptional nature of aluminium, never found native, and so hard to detach from oxygen; yet, when detached, manifesting no more disposition to recombine therewith than gold. His new discoveries solve this paradox perfectly. He first proved that the surface of the metal is passive to quicksilver, as he has before shown in *native* gold, iron, etc; but that wholly contrary to common belief, the internal parts of a piece of aluminium *absorb pure quicksilver* with avidity; so that a piece of rolled sheet is thus quickly *split into component laminæ*. The internal surfaces thus enfilmed with quicksilver, he then proved to possess most surprising

new properties. On exposure to air they at once *take fire spontaneously, and burn with evolution of heat;* a coating of hydrate of alumina, as a bulky, feathery, or filamentary mass, being formed, with a growth so rapid as to be *visible to the eye*, and under the lens wonderful to behold. To condense the discoveries of Professor Wurtz, we give his new theory of aluminium, slightly altering the phraseology for the sake of brevity.

"1. Normal aluminium is in the electro-negative or *passive* state, corresponding to 'passive iron,' for example.

"2. Quicksilver induces an abnormal *active*, or electro-positive state, precisely corresponding to normal sodium and potassium.

"His experiments have shown, as he has maintained in a previous paper, that no amalgam of aluminium is formed; and this newly discovered absorption of quicksilver beneath the outer crust of the metal, he believes to be perfectly analogous to the phenomenon of Professor Joseph Henry's celebrated lead syphon experiment, in which a solid amalgamated lead syphon conducted quicksilver indefinitely through its internal pores from an upper to a lower vessel. Professor Wurtz's deductions from his own theory are of high interest and importance. For instance, he holds the idea that we may confidently hope, as one of the results of investigations in this new field, to obtain a permanently passive form of *iron;* a discovery which, if ever made, will be surpassed in practical value by few others; and he asks why should we not now regard as possible the discovery of sodium and potassium in *their* passive forms, corresponding to ordinary aluminium—in which case these metals could be handled with impunity, and become articles of general commerce. Mr. W. announces that his paper will probably appear in full in the next number of the *American Journal of Science*."—(*Drug Circ.*)

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Aluminium and Silver Alloy.—"A new alloy of aluminium has been made known by MM. Paul, Morin, and Ruolz. It consists of one-third silver and two-thirds aluminium. At first it was found difficult to render the alloy homogeneous, but this difficulty appears to have been overcome, and the alloy is now being supplied at the rate of 38*s*. per pound. It is said to be harder than silver and more easily engraved."—(*Amer. Artisan.*)

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"*Pack-fong*, or *Pak-fong*, or *Tutenag* is an alloy, known by these names among the Chinese, and is composed of nickel and zinc, of each seven parts, and copper five parts. Another quality known by the same name, but more malleable, is composed of nickel fifteen parts, copper twenty-one parts, and zinc twenty-eight parts. Both these alloys are sometimes called Chinese white copper, and are nearly the same as German silver. We give several formulas for the latter: Nickel and zinc, of each one part; of copper, two parts. This composes the finest quality. For rolling, nickel, twenty-five parts; zinc, twenty parts; copper, sixty parts; for castings, nickel and zinc, of each twenty parts; copper, sixty parts; lead, three parts. The original German silver is made from copper, forty parts; nickel, thirty-two parts; zinc, twenty-five parts; iron, three parts. All the above are used as substitutes for silver, to which they are in many cases preferable for durability."—(*Journ. of Applied Chemistry.*)

"*New Electrical Batteries.*—M. Balsamo has presented to the French Academy a battery, both elements of which consist of iron, the one being immersed in a solution of chloride of calcium, the other in diluted sulphuric acid, the two solutions being separated by a porous cell. The iron in the sulphuric acid acted as the positive element, and the other as negative. A constant and quite an intense current is obtained by this arrangement. Another novel battery, termed an 'electric buoy' is now being experimented upon at Cherbourg. It consists of a zinc plate and a cylinder of carbon, attached to a cross piece of wood, having sea-water as an exciting liquid. Still another variety is that of M. Miergue, of Bonfarik, consisting of a cylindrical cell of porous carbon, containing nitric acid, and an exterior cylinder of amalgamated zinc in a cell full of water."—(*Sci. American.*)

"*Artificial Stone.*—Making stone is a business in St. Louis. There is a concern there which makes out of common sand a mantel equal to one of white marble, and sells it for about ten dollars. The sand in a few hours is converted into rock precisely similar to the strata and ledges beneath the earth that required ages of aqueous and igneous action to form them. The process is strictly scientific and chemical. The materials used are common brown or white sand, soda, flint, chlorine, and calcium. The flint, which is the cementing agent, is melted by being subjected to heat, in connection with soda. Flint, in its chemical constitution, is an acid, and, like all other acids, readily combines with an alkali. Combined with soda, the flint (silica) forms a silicate of soda—a thick, viscid, transparent substance, very much like glue. If it is too thin when first made, it is reduced by evaporation in pans till it reaches the proper consistency. It is then mixed with the sand, in a mill from which the mixture comes forth a good deal like wet brown sugar. This substance is called 'pug.' It is very plastic, and works as easily in the hand as wet clay or putty. Each moulder has a quantity of the 'pug' placed in a box on the end of his work-bench, from which he takes handfuls as he requires it to press into the mould. It matters not whether the mould is a rosette, a diamond, a flower, or a leaf ornament—a keystone, a vase, a pedestal, or the section of a mantel-piece—he moulds anything and everything with equal ease, beauty, and accuracy; and when the form is taken from the mould the product is a plastic ornament more perfect and beautiful than a carver could execute in a week of constant and patient labor."—(*Drug. Circ.*)

"*Analysis of Silicates.*—R. Hofmann. Silicates in which the alkaline metals are to be determined and which are not decomposed by acids, may be brought into solution by the combined action of ammonic fluoride and sulphuric acid. The finely powdered mineral is mixed with three or four times its weight of the fluoride, moistened with sulphuric acid, the whole gently heated on the water-bath, and finally over a flame to expel excess of sulphuric acid. The dry residue is dissolved in chlorhydric acid, and proceeded with as usual."—(*Zeitschr. Analyt. Chem.* and *Chem. News.*)

"*Oil-Stains in Marble.*—Can be generally removed by applying common clay saturated with benzol. If the grease has remained long enough, it will have become acidulated, and may injure the polish, but the stains will be removed."—(*Chem. and Drug.*)

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ORIGINAL COMMUNICATIONS.

ELONGATION AND DISCOLORATION OF A SUPERIOR CENTRAL INCISOR.

BY J. H. M'QUILLEN, M.D., D.D.S.,
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A CASE involving the treatment of a superior central incisor, which on account of its unseemly appearance had been a source of constant annoyance to the patient and friends over twenty years, came under my care recently, and has seemed to me of sufficient moment to warrant a description of it. The patient about that period had the left superior central incisor struck with so much violence as to result in the devitalization of the pulp, and consequent discoloration of the tooth. The tooth was subsequently filled on the mesial and distal surfaces, but no effort was made to improve its color. Two or three years after the accident periodontitis was established in the root of the tooth, from which she suffered intensely for several days, and resulting in an alveolar abscess. After the subsidence of this, the tooth became very much elongated, protruding from its socket over one-eighth of an inch beyond the cutting edges of the adjoining teeth; this, combined with the discoloration, gave it a very ungainly appearance, and marred the symmetry of the adjoining teeth, and of course invariably attracted attention whenever the mouth was opened. Coming under my care for the performance of a series of operations, she remarked one day that one of her friends had said she would give ten dollars if I would break that tooth off, so as to make it necessary to have an artificial one inserted in its place. In response, I suggested the propriety of shortening the tooth by filing it down even with the adjoining ones, and removing the discoloration by the use of proper agents. At first she objected very strongly to the use of the file, but eventually consented. The reduction in the length was accomplished by means of a thin flat file, passing from the distal

toward the mesial surfaces, in this way sawing a piece off, with very little inconvenience to the patient, thus avoiding the jarring sensation and constant irritation of the membrane investing the root, consequent upon the employment of the file ordinarily used in preparing a tooth for pivoting. The fillings were then removed from the tooth, the pulp cavity opened into, and thoroughly cleansed by removing all the decay and washing it out with tepid water. After drying out the pulp cavity with tissue paper, the root was *compactly* filled with cotton, and an application of Labarraque's solution on a pledget of cotton introduced into the cavity of the tooth and allowed to remain a quarter of an hour, while operating in another part of the mouth. The application was then removed and a similar one introduced for the same length of time. The change produced was a very decided one, materially improving the color and appearance. Prior to dismissing the patient for that day, the chlorinated application was removed, the cavity washed out thoroughly with tepid water; the cotton in the root removed, and fresh cotton substituted, and the remaining portion of the tooth filled with "Hill's stopping." The care herein observed was to prevent the passage of the chlorinated soda through the root into the alveolus, as it is intensely irritating when coming in contact with a fibrous tissue like periosteum, and, of course, calculated to light up inflammation in that membrane.

The same treatment was repeated in several subsequent engagements, with marked improvement in the appearance of the tooth, particularly after it had been filled with gold. In conclusion, too much care cannot be exercised in employing the various preparations of chlorine for the purpose of bleaching discolored teeth, as the most painful and troublesome cases of periodontitis have been established in consequence of the careless manner in which these agents have been frequently used. While thus a source of irritation to the soft tissues, they do not exert, however, any deleterious influence upon the dentine, but this cannot be said of a preparation, which is recommended by some practitioners as a bleaching agent, viz., oxalic acid, which is a colorless crystallized solid, possessing a strong sour taste, and with such a decided affinity for lime that it takes the latter even from sulphuric acid. As evidence of this, the addition of a soluble oxalate disturbs the transparency of a solution of sulphate of lime by the union of the oxalic acid with the lime. Oxalic acid is frequently used for removing ink spots and other stains from linen, but in effecting this it acts injuriously upon the fabric with which it comes in contact. Its strong affinity for lime indicates how destructive it must prove in employing it in connection with the teeth, and therefore makes it a very unsafe article to use as a bleaching agent in cases of discoloration. In addition to this, while it is a safe remedy when used medicinally in proportions

which experience has indicated as constituting a proper dose, viz., a grain and a half dissolved in eight fluid ounces of liquid, it proves a virulent poison, as cases have unfortunately demonstrated, when an overdose has been taken by mistake, and acts with such rapidity as to cause death in some instances in ten minutes. There is not much danger of such an unfortunate result attending its employment on the part of a dental practitioner, but at the same time it is important that all who may be induced to use it should know what kind of a material they are handling, and therefore employ it with some degree of care.

In using any of the combinations of chlorine with the alkalies (lime, soda, or potassa), it is important that the preparation should be a good one, as it would be folly to anticipate success with an article from which all the bleaching properties had escaped. No doubt the want of success complained of by some practitioners has been due to this. When exposed to the air, carbonic acid is absorbed and chlorine is slowly evolved by these preparations, and it is the liberation of the latter and its combination with the coloring matter in the tooth that produces the desired change. The very best preparations kept in bottles with cork stoppers, or even with ground-glass stoppers if carelessly left open for a short period, soon deteriorate, and then are of no use for bleaching purposes. Labarraque's solution, prepared according to the United States Dispensatory, is a colorless liquid, and, as must be evident from the preceding remarks, should be kept carefully secured, except when being used, in glass-stoppered bottles and in a dark place.

ANÆSTHETICS.

BY H. N. WADSWORTH, D.D.S., WASHINGTON, D. C.

The various plans and articles in use in our specialty for producing anæsthesia are worthy of serious study, and of a character at once exceedingly interesting, and capable of being made a source of very great advantage to a thoughtful and inquiring mind.

We in our department of surgery are yet so juvenile in years as to render any and every well-directed effort toward advancing a matter of moment to all; hence contributions of *facts* pertaining to any branch of our profession are valuable, if not to the older and practicing members, still to the student.

Having in my practice of twenty-one years in this city used pretty extensively the various articles as, from time to time, they have been presented to the medical and dental profession for producing anæsthesia, it has occurred to me to give to my professional brothers a history of the success I have met with in their use, and my opinion of their practi-

cal application to our specialty. A like *résumé* of facts from other members would, I believe, advance us very much in forming correct ideas of the applicability of the various means of anæsthesia to our especial use, and greatly assist the junior members of our profession in forming correct opinions of the safest and best course to be adopted for producing and applying it to our specialty.

In the year 1850 or 1851, I witnessed an operation for removing a necrosed bone from the arm of a lad on Georgetown Heights; the operation was performed by Dr. Cragin and Dr. Stone. The patient was placed under the influence of chloroform, and it was my particular duty to keep up the anæsthetic impression; the result of this operation, which was in all respects a successful one, made a profound impression upon my mind, and suggested the idea of introducing so potent and beneficial an agent into my own practice for alleviating the various painful surgical operations we are so frequently called upon to perform for our patients. In the first place, before administering chloroform to any of my patients, I determined to test its effect upon myself, and with this view called upon Dr. Grafton Tyler, who, in the presence of Dr. Matthews and Dr. Berry, administered chloroform to me and subjected me to some slight painful tests. The action was so perfectly satisfactory that it induced me at once to commence administering it to my patients who desired it, and to continue its use until the gradual accumulation of testimony over the country, proving its frequent dangerous tendency, and occasional fatal results, caused an alarm in my mind lest a fatal result might by possibility occur in my own hands.

The improvement suggested by experienced surgeons of using part chloroform and part of ether did not always give the same favorable anæsthetic results, and left a much more unpleasant condition of the patient after the operation, while ether alone proved to be (although perhaps much safer) quite unpleasant in its after-effects. The tendency, however, of the various experiments and frequent application of both ether and chloroform in my hands was to impress me with its occasional exceedingly unpleasant action upon patients, and the possible danger in some cases caused me to come to the conclusion not to use either of these agents, unless with the assistance of an experienced surgeon, who should carefully watch the action of the anæsthetic upon the patient, while I might be occupied solely in operating.

To a remarkable train of fortunate circumstances alone can I attribute the fact of no dangerous or unfortunate results following the repeated administration of these powerful agents to so many of my patients, *without any assistance,* while my own attention was necessarily occupied in operations.

For the last few years of my practice, I have in no instance (except in a few cases to personal friends) administered these agents to any of

my patients without the presence and assistance of a physician or surgeon, generally the family physician, who has administered the anæsthetic and watched the action of the heart and lungs of the patient, giving me free use of my own mind to the needed operation; the results, with previously mentioned objections, have been favorable; yet there has arisen a general distrust, fear, and dislike for these agents in our department of surgery, to such an extent as to almost banish their use.

In the year 1856, I was called upon by Dr. Branch to exhibit a patent process, which he claimed as his invention, for producing local anæsthesia by congelation. After several experiments, some of which were successful and some unsuccessful, I purchased the right to use the apparatus and apply the principles in my practice.

In testing this method of anæsthesia I found it only certain in isolated cases; for extracting dead teeth, roots, etc. nothing could be better, but if they were adjoined by a tooth having vitality, the intense pain imparted by the freezing mixture was too great for the patient to bear; besides, a question arose in my mind whether a tooth possessing full vitality, if once thoroughly congealed, would not become liable to future inflammation; for unlike the surroundings of the tooth extracted, which are effectually relieved from inflammation by bleeding from the lancet and from the act of extracting, the vital tooth remaining receives no relief of this kind, and is, in my mind, liable to destruction from the disorganizing action of intense cold.

Local anæsthesia by congelation, when applicable, is exceedingly safe and effectual; I have repeatedly cured felons, in their early stage, of the most painful character, by its application: making a small bag of fine ice and salt and applying it to the end of the offending finger, following it by another, until the part, by its white expression, shows its congealed condition, then thoroughly opening to the bone with a lancet; pus will be invariably found deep seated; no pain will be experienced from the operation; *the bleeding will effectually remove every danger of sloughing*, and no further trouble will be experienced from the felon.

Furunculus or common boils too are successfully operated upon by this method, and free from pain. During the time I was in the height of my experiments with the freezing mixture I was suffering from a series of boils, one following another in rapid succession, until my courage and patience were nearly exhausted; finally, one having commenced upon my leg, in such a position as to be easily accessible, I prepared a wooden bowl full of fine ice and salt, and applying one bag after another to the part until it showed evident sign of being congealed by its white expression, I sent a lancet firmly into it, and deep under thick integument and muscle I found quite yellow pus, but not more than would form the size of a large pea; to make assurance doubly sure, I

made another cut deep into the parts, at right angles with the first one, compressed the cuts freely, so as to remove all the pus, and heard no more of the boil. There was not the slightest pain attending the operation, nor afterward, and the parts healed rapidly. From my previous experience, I am sure ten days would have been the period of intense pain ere that boil would have discharged, and a gill of pus would have been the product of its "ripening."

We now come to the last and best system of producing anæsthesia that I have ever tested in my practice—that induced by nitrous oxide gas, protoxide of nitrogen.

Several years ago a gentleman visited the principal dentists in this city for the purpose of selling rights to use what he called, I think, murite of oxygen. I witnessed its application in other hands, but was not pleased with the results sufficiently to adopt it. Those practitioners who commenced its use finally abandoned it as unsuccessful—why I do not know. I believe the article was simply nitrous oxide, but there was want of skill in its application to our specialty.

In October, 1866, a gentleman, representing himself to be a skillful chemist, who had administered the nitrous oxide gas to a large number of persons for exhilarating purposes in his lectures on chemistry, suggested to me its application in my profession as an anæsthetic for surgical operations, to which I consented; and having become satisfied of its power as an anæsthetic, of its general harmless action on the human system, I have continued its use in my practice from that time, and am now more prepossessed in its favor than when I commenced; but few cases have given even slight cause to be dissatisfied with its effect; two or three cases of hysteria have followed its application; two even of these cases have been the result of outside influences quite as much as the effect of the gas, and were in cases of known hysterical tendency, and I do not hesitate to say one and all would and could inhale the gas again with these surroundings provided against, without any hysterical results.

In repeated instances where I have given the gas to patients who have had trouble with their lungs and heart, no ill effect has followed as far as I am aware; the action of the lungs has been natural, and the pulsations of the heart similar to those in a healthy condition, except its increased rapidity from the excitement.

The action of nitrous oxide upon the system is highly exhilarating, leaving the patient, no matter how severe the operation performed, in tone and spirits the most elavated and pleasing; unlike the stimulating effect of alcohol, there is no depression or reaction afterwards; and unlike chloroform or ether, it does not sicken or injure the most delicate patient, nor is attended by a fearful reaction. Upon referring to my notebook of cases, in order to give a thoroughly honest statement of all the

adverse circumstances bearing upon the exhibition of nitrous oxide, I will briefly state each case that has produced slightly *unfavorable results*, among the very large number of cases that I deemed eminently successful and gratifying.

Miss D., aged about 10 years, nervo-sanguine temperament; great mental excitability, intense dread of the operation, great alarm and fear of the gentleman who administered the gas, and probably unnecessary parental influence of a compulsory character exercised by the mother believing it a matter of duty, all combined to excite the mind of the child and unfit her for the healthy and pleasing effect of the gas. The anæsthetic action was complete; the action of heart and lungs good; the operation was rapid and successful; the anæsthesia lasted about thirty seconds, and was followed by hysteria, which continued about four hours, and then subsided, leaving no further unpleasant effects.

Miss P., of almost precisely similar temperament, and high nervous organization, about 8 years of age; temporary tooth ulcerated, slightly painful; the operation successful; all the previous surroundings pleasing, but the after-effect very similar to Miss D., except under the influence of a mild anodyne it lasted only a couple of hours.

Miss P., aged 18, nervo-sanguine; this operation, of the most troublesome and painful character, was attended with evidence of pain such as often follows the exhibition of ether; and it was a matter of extreme difficulty to determine if anæsthesia was or was not produced thoroughly; hysterical symptoms followed for some hours, but gradually subsided.

The evidences of pain were precisely similar with the gas and with chloroform in this case, having given Miss P. the latter one year before. These two last patients were intimately related (aunt and niece).

Mrs. S., nervo-sanguine; subject to hysteria; several difficult teeth and roots to remove; administered the gas four times (being deceived by the quiet manner of my patient), the pulse and lungs normal; the operations requiring more time than one or two inhalations permitted, and my patient requesting me to finish; hysteria followed, of a very severe character, and the family physician being called in after her return home, he administered the usual remedies, which soon reduced the symptoms, and no further ill effects followed.

Mr. H. and Mr. F., nervo-sanguine temperaments; whiskers and moustaches inclining to red; the first operations successful; anæsthesia good, but patients having a dreamy consciousness of what was going on; at the second operation became very violent, so much so as to make it impossible to operate; the second exhibition of the gas resulted in total inability to operate, the mental excitement making the patient totally unmanageable.

These temperaments are often found unsuited to the exhibition of nitrous oxide; one operation may be accomplished, but further than that

it is often difficult to proceed; this temperament is one of the most difficult to manage, as all operators well know, even when reason is normal; the most trivial irritation or pain puts them in a fever.

Mr. T., Captain C., Mr. H., nervo-bilious temperaments; first operations successful; anæsthesia perfect; action of pulse and lungs good; the second operation exciting a dreamy consciousness of being injured; the belligerent faculties became excited, and a regular fighting movement followed, rendering an operation almost impossible. Mr. T. said "he appeared to be in a machine shop, and some one was forcing him toward a wheel, which was revolving, with a large piece of iron projecting, and each time it revolved, the iron struck him in the mouth!" It was impossible to hold or tie him so as to operate at any future administration of the gas: each trial gave the same dream.

Captain C. thought he was held on a table by men who were attempting to thrash him on each exhibition of the gas; he had the same dream and at the same place. I caused him to be tightly held, and successfully operated, with no consciousness of pain.

Mr. —— "dreamed several men were after him, and he had to fight," and I could not operate at all at the second administration of the gas. The first administration was successful and satisfactory, and I removed two bad teeth.

These are the only failures, if they may be so called, in the very large and extensive use of nitrous oxide gas in my practice, and they have been carefully noted and related, that a fair judgment may be passed upon the merits of this compound as an anæsthetic.

In nearly all the above cases, I do not hesitate to assert, with my present knowledge of the peculiar action in such cases, I could now make it successful, by having the attending circumstances different in some cases, and by exhibiting the gas for but one operation at a time in the others.

And in view of the large, *very large number* of most beautiful and successful operations of the most difficult and painful character, I do not hesitate to pronounce this agent by far superior to any yet employed by myself. In nine cases in ten—yes, I may safely say in nineteen cases in twenty—it has proved successful in my hands. The inhalation generally occupies about twenty-five or thirty seconds, and continues its action about sixty seconds on an average, though many patients recover almost instantly after one tooth is extracted. At other times I have removed ten under the influence of one inhalation, and during this time, no matter how severe the operations, the impressions are of the most pleasing character, and the patient awakens with a smile or a laugh on his lips or a joke on his tongue.

The action upon the heart is nearly always exhilarating, and the pulsations are increased to a considerable extent, but almost instantly be-

come normal on removal of the inhaler; but I have yet to see a case where the pulse has fallen or indicated prostration after the operation; on the contrary, there is an unusual expression of exhilaration follows its use, and no corresponding prostration.

I must, however, mention that in some few cases at the height of its exhibition, I have observed a slight depression of the pulse, which has caused me to immediately interrupt the action of the gas. The anæsthesia in all these cases has been perfect, the operation successful, and the pulse normal, the next moment. I have, however, the impression that the gas in these cases would be dangerous if carried too far. A second administration in some two or three cases of this kind, when I have had more teeth to remove than could be accomplished at one inhalation, has (while it would give the same slight sinking of the pulse) been equally successful, and in no way injurious to my patient.

The preparation of nitrous oxide gas is exceedingly simple, and may be readily undertaken and successfully accomplished by any one having a knowledge of the simple elementary principles of chemistry, who will be careful in his manipulations. It is necessary that the gas should be perfectly pure, otherwise the effect will be unsatisfactory, and its administration exceedingly dangerous. It should always be administered from a bag or tube having a valve, that prevents the patient from respiring into it, but whose respirations shall be into the external atmosphere, and the administration should always be under the careful eye and direction of a professional man, who watches the lungs and the pulse; under these safeguards I consider it the best-known article for producing anæsthesia for our specialty, and I am greatly inclined to the belief in many of the minor, if not the capital operations of general surgery, it will be found equally efficacious. The great difficulty we now have in its use in our profession is its short anæsthetic duration when inhalation is discontinued; and if a method can be discovered by which the inhalation can be continued while we are operating, it will be all we can desire. In all the other surgical operations, except those of the mouth, it can be continued as long as desired, or at least has been continued seventeen minutes; and I see no reason why it could not be even longer, by allowing the patient to mingle occasional atmospheric air with the gas.

It will be remembered among the cases in which the gas was exhibited and mentioned as presenting unfavorable circumstances, was that of Miss D. During the writing of this article, her mother called for the purpose of consulting about the removal of another very bad molar tooth, and to ask my opinion regarding the propriety of again using the gas. The operation—one of the severest—required an anæsthetic of some kind, and, notwithstanding her former unpleasant symptoms, which I have already narrated, and which were even more unfavorable than described, and her physician advising her mother never

to let her take it again, I decided to give it to her once more, because I was, as I said before, convinced that all of the untoward symptoms were the effect of a series of unfavorable surroundings acting upon the mind of a nervous and delicate organization, which, if properly counteracted, would leave the anæsthetic action of the gas to exert its full power, and its general pleasing after-results would be shown in her case as in all others. Here I will quote her mother's written memorandum, handed to me for the purpose of causing my decision to be a cautious one:

"I feel great concern for the effect of the gas on Mary, she suffered so severely the only time she took it; five hours of insensibility, her head burning hot, her feet and hands cold, and when she aroused at all it was to wild shrieks of terror; her eyes rolled up, and her condition most distressing. Dr. S—— told me never again to give it her; but I leave it to your judgment, only I am very anxious as to the result."

The second exhibition of the gas was most perfect, and attended by none of the previous unfavorable circumstances, and the operation not having been completed at its inhalation, I immediately gave it to her again with the same result. The operation being a protracted one, I did not quite finish it ere she recovered, experiencing a little pain at its termination. My operation still being not quite complete, and not wishing to give her the gas three times at one sitting, I postponed the termination of the operation until another sitting, when I shall use it again.

In my article, a full history of my own practice has been given without any attempt at describing the method of making or administering nitrous oxide gas. The student of dental surgery can always perfect himself in all the details at our colleges, and several works are now to be had, giving all particulars necessary for making and using it.

I will terminate this article by advising all in our profession, either to administer nitrous oxide gas to their patients when an anæsthetic is called for, or give them the privilege of obtaining it through others; it being in my estimation a blessing that can hardly be overestimated for its successful results, its freeness from danger, and its healthy and happy impressions.

INFLAMMATION.

BY WM. H. ATKINSON, M.D., NEW YORK.

At the inception of the New York College of Dentistry, while it was yet in its formative condition, under the name of the New York Institute of Dental Surgery and Art, the effort was made to demonstrate the act of nutrition (to the class, as they will bear testimony) in normal or physiological expression, thus laying a firm basis upon which to erect a sound doctrine of pathology, whose prime minister is this same vexed manifestation denominated Inflammation.

The effort was made to instruct them that (as had been verified years before at Cleveland in actual experiment, to which I then referred) it was impossible for the arteries to take any immediate part in the act of normal nutrition, for the plain reason that the rapidity of the transit of the whole blood column rendered it so, without some arrest opposed the regularity of the flow, converting the rapid current into a static pool.

This forced us to the conclusion that nutrition, normal or abnormal, must be confined to the territories in immediate contact with capillaries and veins as a whole truth.

This was interiorly perceived, long before it was actually demonstrated, in the tail of the tadpole, young fish, etc., to the eye under the microscope.

The marvelous reproductions that had taken place in my patients before my own eyes of the proper tissues of the parts, whether of bone, vessel, or nerve, out of a colloid magma, that filled the chasm from whence the osseous and other necrosed parts had been taken, led into very intense mental exercise as to what source we should look for the seed, so to speak, of the new tissues; and here again the theorem was fairly preconceived some time before the practical demonstration was vouchsafed. Immediately adjoining the original healthy structures on the outskirts of the colloid plasm filling the cavities, the first appearance of cell-like structures made their advent, which was repeatedly shown by injudicious dressings (overdressings, meddling), causing the new growth to separate and slough away from the primary surrounding tissues.

Upon examination this proved to be composed of stellate, ovoid, spherical, and flattened disk-like cells, and some true connective tissue cells quite well formed and well defined; also the so-called plasmatic or amœboid irregular cells with granular contents answering to nucleus and nucleolus.

In the ardor of the desire to give the newest and best results, from gatherings by readings, listening, and interrogation of Madame Nature, by my own crude blundering methods in a place where I was only laughed to scorn as "outré," "cracked," "egotistical," etc. etc., I did somewhat enthusiastically undertake the arduous labor of communicating my highest and best conceptions to the dental societies of this city and to the class of pupils before referred to as in attendance upon the course of instruction in the New York Dental Institute of Science and Art, held at 746 Broadway, in 1863 and '64.

In the intensity of desire that the pupils should not fail to comprehend what I regarded as the key to unlock the whole rich treasures of physiological and pathological activity, I kept the class frequently till nine and ten o'clock at night—always exceeding the time set apart for the lecture—endeavoring to vary the statements and delineations upon the blackboard, and drawing analogies from the meshwork of laces and

webs made up of fibres and amorphous vessels; also vessels mixed of meshwork and structureless portions of tissue.

I distinctly recollect crossing my fingers so as to form squares between them, and then assuming that there was a tenacious fluid closing up or stretching across the spaces, and then blowing upon this until it would bulge out and form a globular protuberance beyond the fingers, then, closing the spaces, cause the bulb to assume a spherical form; and thus, by the instancing of parlor rubber balls, illustrate how these spheres by pressure became cubes and other elongated and flattened forms of modified spheres, taking on the shape of every cell and filament constituting the various tissues where lost by traumatic or nutrient activities. This led me to state my conviction that all truly nutrient action was extravascular and in the juices of the flesh in which the blood disks or corpuscles, white or red, were metamorphosed into healthy or diseased growth, or consumed in nourishing already formed anatomical elements.

You may well bear with me, then, when I tell you by the following quotation that the pathological half of the dimly conceived and poorly defined doctrine of my novitiate has been so clearly demonstrated by a competent observer while investigating the subject of this evening's discussion (namely, "Inflammation") in the mesentery of the frog, the parent of the subject of my own poor efforts in the woods of the U. S. of A.

"Upon the external outline of the venous wall, several small, colorless, button-shaped elevations arise, just as if the vascular wall itself produced excrescences. These excrescences slowly and gradually enlarge, until a half globe of about the size of a half white blood corpuscle seems to lie upon the exterior of the vessel; further on this becomes pear-shaped, with the pointed end attached to the wall of the vessel.

"Now fine processes and points begin to radiate from the circumference of the pear-shaped corpuscle, which assumes manifold variations of form; above all, the main body of the corpuscle moves more and more away from the vessel, the tapering end being gradually elongated to a long, fine pedicle, which finally dissolves its connection with the vascular wall; so that we now have before us a colorless, somewhat lustrous, contractile corpuscle with one long and a few short processes, which differs in no respect from a colorless blood corpuscle.

"Not a little self-control is required on the part of the observer to confine his attention to this one point. For during the time which passes between the first protuberance and the liberation of the corpuscles—sometimes more than two hours—a large number of other colorless corpuscles are pushing forth at other points of the vascular wall, so that all stages of the process just described on one corpuscle may be seen at one time on the same vein by casting a look over the field of vision.

"Gradually the number of corpuscles appearing outside becomes larger and larger, and three or four hours after the first protuberance arose on

the outside of the vein, the latter is surrounded by a simple but dense ring of such corpuscles. And in a few hours more it is no longer a simple layer of corpuscles that envelops the vessel, but a swarm of them extending upon all sides, four, six, or more rows of irregularly but densely crowded corpuscles succeed each other, those of the inner row still attached to the vessel by their pedicles, while those of the outer row shorten their pedicles, and finally present the ordinary changing configurations of contractile blood or pus corpuscles.

"The time in which all this is accomplished varies not alone in different animals, but in different vessels of the same mesentery; in some it is only three or four hours, in others it may take twelve, even fifteen hours. While the corpuscles are leaving the vessels (which takes place in all veins, from the smallest up to the main trunks), the interior of the vessels is maintained in the above-described condition; as before, the peripheral zone is occupied by a single uninterrupted layer of white blood corpuscles, within which the red stream continues to flow. Cohnheim expressly adds, that among the corpuscles which appeared at the outside of the veins there was not a single red one. * * *

"But in the capillaries not only colorless elements leave the interior of the vessel, but *red corpuscles also* penetrate the walls.

"Not a few of the roundish bodies appearing outside of the capillary outline manifest themselves by the characteristic yellow or yellowish green color of the hæmaglobine; as red blood corpuscles, these bodies differ in size, some being no larger than the nucleus of a red corpuscle, the smaller being globular, the larger appearing as curved disks.

"There is not the least doubt but that they are really parts of red blood corpuscles; for quite usually we see at the corresponding point the rest of the corpuscle—mostly that portion which contains the nucleus—lying within the capillary and connected with the outside portion by a narrow neck inclosed by the capillary wall.

"And in this unlucky situation the corpuscles may remain for hours, or, if the stasis in the mean time be interrupted by a new impulse, the current may tear the narrow neck and sweep the inside portion away. Yet sometimes also, a corpuscle succeeds in passing the capillary wall whole and uninjured.

"Thus, then, from twelve to twenty-four hours after exposing the mesentery we find a large number of capillaries surrounded by dense rings of corporeal elements, the majority of which are colorless, contractile cells, the minority red corpuscles, either entire, uninjured, nucleated disks, or smaller, round, or elliptical, non-nucleated formations, undoubtedly the remnants of maimed blood corpuscles."*

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* Cohnheim's Researches on Inflammation and Suppuration. Communicated in extract, by G. Baumgarten, in the St. Louis Medical and Surgical Journal, No. ii., for March, 1868.

This is the explanation of why both enlargement to fullest capacity by warmth and contraction by chill or high heat below the size necessary to permit the corpuscles to pass freely through the capillaries and venioles are alike subversive of the inflammatory process.

The facts have been long observed and well known, but now we are able to perceive the principle, the reason why inflammation is equally arrested by the extremes of cold or heat. We also have in this the solution of many hitherto undemonstrated truths of the vital economy, among which prominently stands the color of muscles as the result of diffusion of the cruorine of the destroyed red globules.

The history of the extravasated blood corpuscles, white or red, subsequent to their advent into the cell territories in the juices of the flesh, will correctly instruct us in the doctrines of Nature's own laboratory in the formation of normal or abnormal issues, pus, sanies, and other cell débris.

The abnormal tissues are presented in the various tumors, fibrous, colloid, cancerous, etc., all of which arise from debilitated corpuscles, in their efforts to work into normal tissues.

Pus cells are these same bodies (namely, blood corpuscles) still further deprived of life endowment. These are endowed with differing degrees of contractile power, and are only true pus cells when so far reduced in vital energy as to be no longer capable of being wrought into even abnormal growths or tissues as above cited.

Sanies is the disintegrated debris of these same bodies, when killed by a more rapid process of debilitating presence operating so promptly as to afford no time for the formation of morbid growths, or even the small retention of individual form in the pus cells; and also the chaotic remnant of pathological growths in disintegrative solution.

Thus it will be seen that inflammation is but "perverted nutrition," and is the evidence of the struggle for dominion of the body between the "vis vive" normal to it and some debilitating or malign presence from without, that has found means of entrance to a territory not its own until it has dispossessed the rightful lord of the soil and reduced it to the character of tumor, pus, or sanies. Tumors and pus being a compromise between the opposing powers, while sanies presents the dominion of malignity complete.

The minute history of the corpuscles involves the entire production and metamorphosis of each cell and tissue; including every act of the separations and combinations of proximate elements by which the organs are produced and destroyed, whether the rôle be formative or destructive, physiological or pathological, and hence can only be hinted at in a paper of such limited proportions as is fitted to our use before this body.

Let it suffice then to say, that in normal nutrition the white corpuscles

are distributed to the white tissues, the red to the muscular fibrillæ; but in disease these distributions may be transposed or mixed and altered in numerous ways, as instanced in the red sputa of acute pneumonia; and in carbuncle, by the wine-colored weepings from the many mouths of the "ant heap" or chimneys of the volcano in such painful eruption.

CRYSTALLIZED GOLD VERSUS FOIL FOR FILLING TEETH.

BY DR. E. HONSINGER, CHICAGO, ILL.

In the March number of the Dental Cosmos appeared a paper, read by W. H. Trueman, D.D.S., before the Odontographic Society of Pennsylvania, "upon the relative merits of crystal gold and gold foil as a material for filling teeth," the reading of which satisfied me that he spoke the truth when he said that it was written under the influence of a strong bias in favor of foil. He goes on to prove that crystal gold is not a good material, or rather good form of gold for filling teeth, because a committee of dentists (whom we all know stand high in the profession) reported against it in 1855, when crystal gold was almost in an embryotic state, when it embodied but few of the good qualities possessed by it to-day, so that an honest report then and at the present time would differ widely as a matter of course. He argues further against crystal gold by saying that all its advocates differ in their methods of using it. Some assert, says he, that it should be inserted in as large pieces as the cavity will hold. Others again deny this, etc., and I do not find any two of its advocates agreed upon the manner in which it is to be used or the instruments employed.

Does that prove anything? Do not those who use foil and who stand deservedly high in the profession, differ widely in the use of foil? Some use it in pellets, some in cylinders, others in rope or roll, and some in ribbons. That proves nothing against foil, nor does the other against crystal gold. It only proves that there is a difference in operators, and that we grant. He further proves the unfitness of crystal gold for filling teeth by saying that "any sliding motion among the crystals, an indiscreet thrust of the instrument may produce, after they are in even the slightest degree united, impairs, and in a measure destroys their cohesion." This, he says, may occur a dozen times while putting in a plug. It should not and would not occur to a careful operator under any circumstances or with any material for filling; and when occurring it would only prove against the operator, not the kind of gold. That style of manipulating would ruin any filling and the reputation of the operator. He remarks that "as crystal gold is only held by the attraction of cohesion (that is, I believe, the way all gold is held together), these little pellets of crystals imperfectly inserted will loosen and drop off, leaving

the vital point of the filling exposed." He further says: "This, gentlemen, is no fancy sketch. It occurred to the writer in two out of three fillings put in, and I suppose it has to the other, though I have not seen it." No doubt such has been his experience; still that shows only that he has made but a limited use of crystal gold; and further, that to use it successfully requires some skill in handling.

The argument, or rather objection that it was patented, and that it was not A. J. Watts' idea, weighs nothing against the gold. If some one else conceived the idea, it remained for A. J. Watts to perfect the article, and he is certainly deserving, as he receives the gratitude of a liberal profession.

I do not attempt to speak for Lamm's shredded gold, nor Morgan's plastic gold, though they may be a distant relative of Watts' crystal. I have used Morgan's sufficient to satisfy myself that it does not possess as good welding properties as Watts', and shows an inclination to pulverize, fine particles falling off by handling. An examination of Lamm's without trial, satisfied me that it will do the same. Though some claim to work gold under water, I do not believe it possible to work gold in any form successfully into fillings under water or saliva. I have for the past twelve years at least used exclusively, except for root filling, A. J. Watts' No. 2 crystal gold, having previously used foil for eight years, and I have deliberately come to the following conclusions: That nearly all the preparations of gold for filling teeth are susceptible of being wrought into good and durable fillings, and that the success depends more upon the operator than the gold used; yet honestly believe that *I* can save a much larger proportion of teeth filled with Watts' crystal, than with gold in any other form. I can make fillings with it in any tooth where I could with foil, and in many where I could not,—building up parts or whole crowns where I could not with foil, for the reason that gold in the crystal form possesses the best possible advantages for welding. The only place where foil is preferable, in my opinion, is for root filling; rolling it upon a fine broach it may be forced nearer the apex than crystal. I do not find the blackening spoken of by Dr. Trueman in my practice, often seeing ten or twelve fillings in one mouth, which have been in several years, and looking as good as new. If they blacken, it is no fault of the gold, but of the operator. If they appear to have shrunken from the walls of the cavity, it is for the same reason.

The gold prepared by A. J. Watts, in the crystallized form, has been uniformly good for several years, and far superior to the first article given to the profession. The prejudices against crystal gold arose chiefly from its use, before it was brought to its present state of perfection, by inexperienced operators and badly constructed instruments.

The writer, alluding to what was claimed for crystal gold, viz., "that

it requires less labor and skill for its use," arrays that as an objection. I know by a long experience that to use it properly and successfully requires as high an order of talent and as good manipulative skill as foil, and it is sheer nonsense to compare it with the "well-known and much-abused amalgam."

I suppose it was upon the above hypothesis that the doctor operated with crystal gold, when his success was so agonizing.

PLASTER IMPRESSIONS.

BY ARTHUR C. FORD, ATLANTA, GA.

In looking over the proceedings of the Society of Dental Surgeons of the City of New York, recorded in the last number of your valuable monthly, I perceive the subject of "Impressions" was discussed at considerable length, and, as usual, there was quite a diversity of opinion. I find, somewhat to my surprise, some advocating wax in preference to plaster, but perhaps that shows my ignorance, I having been under the impression that the former mode was entirely obsolete; I have not myself used wax but once since 1855, and that was in a very peculiar case. I have invariably used plaster since the time named My mode of manipulating is somewhat different to any *I have seen described.* I will therefore give it, trusting it may lead to improvements.

First I select my impression cup (I use White's britannia, the bottom of which I have perforated with small holes, to cause the plaster to adhere better); my water is warm (tepid), with a little common salt dissolved in it; I mix my plaster quickly, tolerably thin (the consistency is soon learned by a few experiments), fill my impression cup moderately full, and place about a good teaspoonful on a mouth-napkin, previously folded four double, to absorb the extra moisture more rapidly, and place this plaster quickly in the roof of the mouth, pressing it out over the whole arch. I then insert the impression cup, holding it steadily until set, which does not take generally over two minutes; in partial sets I do not let the plaster harden quite as firmly as in full; any pieces that may become detached, I carefully collect and adjust to their places. I then varnish my impression lightly with shellac dissolved in alcohol, slightly oil; if a partial set I fill the impressions of the natural teeth with water, and after mixing my plaster to a moderately thick batter (with cold water), pour it in, shake down well, and then fill up as much as I require. Care has to be taken in separating; I chip the impression gradually, commencing at the outer edge, until I arrive at the upper ridge of the gum, and if there are any teeth, until *every tooth* is *entirely clear*, and then the remainder can be easily removed from the palate in one piece. I usually cut out my chamber, when I desire one, in my im-

pression. I cannot see how a wax impression can be in any way compared to one taken with plaster, and I think the inconvenience to the patient is inconsiderable. The way I mix my plaster necessitates rapid manipulation; it is not uncommon for me to be delayed by my patient's inattention, or slowness in some way, and the plaster will in such cases set before I can put it in the mouth, so it can easily be understood that the patient is not much annoyed by the plaster "getting into the fauces," or having to remain in an awkward position "eight minutes."

In contributing the above article, I do not in the least desire to obtrude my opinions upon any; I am perfectly aware that the facilities that the members of our profession in your cities of New York, Philadelphia, Baltimore, Boston, etc. have for improvement in every way, especially of late years, far exceed anything we can enjoy here; and I have, therefore, felt diffident in attempting to contribute aught to your magazine, but if in your estimation there is anything worthy of publication in these few lines, you are welcome to them.

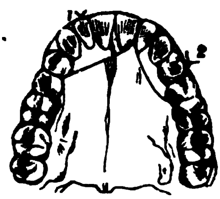
THE STRING DAM—FANG FILLING.

BY ARTHUR C. FORD, ATLANTA, GA.

In the February number of the Dental Cosmos, I find an article entitled "The String Dam," etc., which I had heretofore considered had been in general use for at least fifteen years, if not longer. In 1853 Dr. Benj. Lord, of New York City, with whom I was then studying, initiated me into the use of what he called a ligature, if I recollect correctly, and I have ever since then resorted to it with great satisfaction and benefit.

My "modus operandi" and "string," however, is not exactly the same as that used by Dr. Stevens, but undoubtedly it has the same object in view—namely, the arrest of hæmorrhage and pressing away of the gum from the neck of a tooth when decayed below the margin of the gum; and also I have found it of great service with spongy gums, where there seems to be a continual omnipresence of saliva kept up by capillary attraction. My manner of applying it is as follows: I first take a common *cotton* string, such as ladies call "cord," and wax it, and force it between the teeth where the filling is to be inserted—of course the teeth have been previously separated by file or wedge if needed—pass it *around the tooth to be filled,* and thence backward to the next teeth between which it can most easily be forced, bring both ends of the cord round in front, and tying as much out of the way and as tightly as possible. I then take a burnisher and press the cord as high up as I need, or low down, if operating on the inferior teeth; sometimes I place a piece of spunk or bibulous paper beneath the cord

—the former is the better; but I only use these in extremely bad cases of wet mouths or spongy gums. I send you a diagram that will perhaps explain better than words. The left central incisor, posterior approximal surface, is the part supposed to need filling, the cord has to be adjusted as No. 1; if the ant. approx. of the lateral incisor, as No. 2.



I have found the above mode of incalculable assistance, and with the adjuncts of spunk or bibulous paper and mouth napkins, have generally managed to keep my cavities and filling dry. I do not, however, claim originality, and would not have mentioned the operation were it not for the before-mentioned article.

I would also here say a few words on another operation, upon which there seems to be a great diversity of opinion, as well as mode of manipulating—that is, "fang filling." Without discussing the modes pursued by other operators, which seem to be "legion," I will simply give mine, which I have found very successful, though probably it is not infallible. If the nerve is alive, I destroy it in the most usual way with arsenious paste, which I never desire should remain in *over* twenty-four hours. I then extirpate the nerve as nearly as possible—occasionally all cannot be removed at the first sitting—syringe out the canal with tepid water, dry out, and apply creasote on a pledget of cotton, and fill the cavity in the crown *loosely* with bibulous paper (I have found a tight filling of anything generally induces inflammation of the periosteum); next day I repeat the same treatment, and then every other day until about the end of a week, when I proceed to fill. I use No. 4 adhesive foil usually in small rolls, annealed *just before using*. The first piece to be inserted I slightly touch with creasote, and carry well up *toward* the apex of the root, but not quite to it, and consolidate it well; then introduce a second piece without creasote, and condense thoroughly. I then take some gutta-percha, previously cut up in small strips, warm slightly, and force it up the canal until nearly filled, when I commence with gold again, and continue until the crown is entirely filled.

I believe this mode is preferable to filling the entire fang with gold, and decidedly more so than either leaving a vacancy between the apex and crown filling, or using wood or cotton. I have personally experienced great inconvenience by having the nerve canal of a cuspid filled with gold, especially in cold weather. Now, gutta-percha, being a good non-conductor and easily manipulated, and shut in from outside influences, I think is just the material needed; Hill's stopping of course will answer just as well, but no better, and certainly in point of economy will not compare.

I am not vain or egotistical enough to think that I am the only per-

son that has ever filled nerve cavities in this style; all I can say is, I do not recollect any one suggesting the mode to me, but have no doubt others have tried it; perhaps there may be some disadvantages; if so, I would be obliged to some brother to set them forth, as I am ever open to conviction, and thankful for information.

SALIVARY CALCULUS.

BY WM. H. SHULZE, WATERTOWN, WIS.

Mr. H——, aged 52 years, in good health, called to have a tooth extracted; second right superior molar,—the only tooth on that side. Upon examination, was surprised to find what appeared to be *considerable of a tooth.* A deposit of salivary calculus was attached to the buccal and posterior side of the crown, seven-eighths of an inch in diameter, from anterior to posterior; one and one-eighth inches perpendicular with tooth, extending up over the gum as far as possible, and three-fourths of an inch in diameter, from tooth to surface. The anterior portion of the deposit was quite hard and compact, while the posterior part was soft and pitted, resembling very much a piece of coral, evidently the part most recently deposited. It was of a pale-yellowish color, and had accumulated in "less than four years." The tooth and deposit weighed nearly half an ounce.

PERIOSTITIS.

BY HENRY S. CHASE, M.D., D.D.S., ST. LOUIS, MO.

Case 1.—Miss G., aged 14.

July 10th, 11th, 14th. Filled thirteen dental cavities with gold. Were quite sensitive. Used nothing to obtund pain.

August 1st. Patient came in with her mother, and complained of all the teeth being sore. Could not eat upon them. Eyes dull and heavy; flushed face; headache. Did not sleep at all the previous night, owing to pain in the teeth.

Dismissed patient with the following prescription: to take saturated solution of iodide potass., one drop every hour until better, or the next day, when she is to call again.

August 2d. Patient called again. Same symptoms continue.

Dismissed with the following prescription: mercurius vivus, third decimal preparation. One grain every hour until better, or the next day.

August 3d. Patient called. Symptoms better. To continue the mercurius as before.

August 4th. Patient well.

There is no medicine known to me that has such curative qualities in periostitis as mercurius vivus, prepared in the manner used by homœopathists. Indeed, it is the great polychrest in dental diseases.

Case 2.—Mr. M.

August 19th. Called and had right first and second molars plugged on their contiguous approximal surfaces, with amalgam plugs extended a little below the margin of the gum.

August 26th. Patient called with severe toothache between these molars, which are sore to touch, and loose. Thinking that the plugs might be impinging on the periosteum, I examined them and found them apparently all right.

To take mercurius vivus, third decimal preparation, one grain every hour until better. To report next day if not cured.

Patient has failed to report, and I doubt not was cured.

EXPLOSION OF VULCANIZERS.

BY H. TOWNSEND, PHILADELPHIA, PA.

As I have just had one of Whitney's No. 2 vulcanizers to explode this afternoon, and this being the third one we have had to do so, I feel it no more than right the readers of the DENTAL COSMOS should know there is some danger all the time. Does any one know how often a boiler can or ought to be used before the metal is weakened? One minute before the explosion, it stood at 280°. We have been in the habit of heating it up to 340° and 350° for half an hour. I have had it about two years, but only in constant use about six months. I do not write this to find fault with the machine, but feel that the fact should be known that there is danger all the time If you think this worth a notice in the DENTAL COSMOS, give it place; if not, let it go for what it is worth.

SUPERNUMERARY TOOTH.

BY THOS. J. SPECK, ROGERSVILLE, TENN.

I HAVE met with a singular instance of a supernumerary tooth, and never having seen a similar case recorded, propose to describe it for the benefit of your readers. The case is *four* large, healthy, perfectly-formed molar teeth on the left side of the lower jaw. The greatest interest in the case is that the two back teeth are united together—the union being perfect—no signs of a joint or crease between them. The person is about thirty years old.

PROCEEDINGS OF DENTAL SOCIETIES.

NEW YORK ODONTOLOGICAL SOCIETY.

BY DR. W. C. HORNE.

February, 1868.

DR. R. K. BROWNE being present on invitation to offer his views on the character of the dental tissues, proceeded to say that nearly if not quite the whole of the knowledge pertaining to the stages of growth, the structure and the physiology of the dentine, had yet to be acquired.

This we may at once comprehend by an estimate formed from a moment's correct reflection of the character of the unreal notions which issue from men's minds in the field of this destitution of *knowledge*. And it is not until we utterly cease to regard these notions as anything but mere void representations in words of the complete *absence* of knowledge, that we shall have begun the taking of the first step toward that knowledge.

He would, therefore, to-night take a brief glance at some of the notions referred to, showing the impossibility of their being true, and afterward contrast them with the several points of knowledge we have gained.

First, as to the soft-solid fibril-like extensions of matter, called "dentinal fibrils," which proceed inward from the pulp and fill the dentinal tubules, which are, truly speaking, *canals*. These have been imagined to be *nerve fibres*, and we have frequently seen the assertion made that these nerve fibres have been demonstrated. I cannot persuade myself that whoever makes this claim has ever really seen a single nerve fibre under the microscope. Leashes, trunks, or bundles of nerve fibres he may have seen with the naked eye, perhaps, but never a single nerve fibre. Because in all their characteristics there are no two fibril forms in the body so markedly unlike, each presenting distinctively so marked a difference of histological characters, as a nerve fibre and a dentinal fibril. In all their characteristics, except the physical one of elongation of shape, these two are totally unlike, and *most* unlike—in short, have no resemblance.

First, the difference of size is as one to six or eight. The fine nerve fibres—that is, the finest we can observe with very high powers of the microscope, if, indeed, they of this size be single and simple—are not less than from the $\frac{1}{30000}$ to $\frac{1}{85000}$ of an inch fine. The dentinal fibrils are about the $\frac{1}{8000}$ or $\frac{1}{10000}$ of an inch. The smooth continuity of the latter is so unlike the remarkable *un*smoothness, which is a conspicuous peculiarity of the fine nerve fibres, that one who had scanned the two forms would pronounce the former the very type and representative of the utmost unlikeness in this respect to the nerve fibre.

Again, all nerve fibres, without any exception, present in themselves marked elements or points of structure, and many of them of compound structure, as, for instance, the leashes of nerves of the spinal axis, which consist at least of neurilemma and axis cylinder, while the other and finer nerve fibres of the same *and* the organic system of nerves present elongated nuclear and fibrillar portions in unbroken continuity. Besides, if these fibrils were nerve fibres, their continuity with *the nerves of the pulp* could not fail of being traced or observed; hence the attributing to them the quality of conductors of sensibility (from the presumed theoretical necessity of which arises the imaginary notion of their being nerve fibres) requires that they be extension of the nerves of the pulp. Upon this latter point, we may say, no doubt exists, for many of the latest examinations of the dentinal fibrils, with the best modes of preparation, and the highest powers of the microscope, have been made for the sole and especial purposes of discerning any structural connection between the dentinal fibrils and the nerves of the pulp, and had there been such a connection, it could not have been unseen.

Lastly, it has been observed that these fibrils are extensions into the dentine of connective tissue, for I have myself plainly discerned that these fibrils are connected with the connective *tissue* of the pulp substance. And in thus showing that they are mere extensions of *that tissue*, they immediately correct all our imaginings by substituting therefor this much actual knowledge.

Whatever the character and the nature therefore of the tissue, if any, which, in the tooth, responds to impressions by the phenomena of sensibility or pain, it may be said to be known that dentinal fibrils are not *nerve fibrils*. In the absence of any trace in the dentine of any tissue resembling a nerve fibre, we may still *imagine* the dentinal fibrils to embody the function of sensibility for the tooth, but we are not left to imagine that they are nerve fibres, since it has been demonstrated that they are extensions of connective tissue. In this immensely magnified copy of a microscopic image of a flat fragment of a tooth, from a fresh specimen which has been immersed in carmine, glycerin, and glacial acetic acid solution, we have a correct representation of the dentinal fibril throughout its length—its middle third—*in situ*, filling the dentinal canal; its inner and outer third on either side being freed from the dentine surrounding the middle of its length, and separated from neighboring fibrils. [Speaker exhibited a magnified figure of these elements, drawn by him in colored crayon.]

In this figure, we have a representation of the several fibrils, severed and separated from their neighbors, and the inclosing dentinal mass, extending from the point where their inner end is bounded by the surface of the pulp chamber. Within this is figured, precisely as it was in the specimen itself, the diverse forms of connective tissue, its cells and

their extensions or processes. In this specimen we have a demonstration of the anatomical form and substance with which the dentinal fibril is continuous beyond the dentine—that is, in the tissue of the pulp chamber.

One of the fibrils is seen to be continuous with the substance surrounding a body of the connective tissue or plasmatic cell, forming rather a sheath to the cell than a continuity of the body of it. Here it is palpable that this fibril and cell—the one a connective tissue cell, the other an extension of the inter-connective tissue substance; both together structural fractions of connective tissue—are not something else widely different, namely, nerve tissue.

In the observations on these specimens, the tissues were not permitted to dry, but being kept therefrom from the first, were examined under a Recklinghausen moist-chamber, which secures exemption from any change in the hydroscopic state of the specimen.

[The speaker here remarked that he supposed the nerves of the pulp were nerves distributed to and accompanying the vessels themselves, and *regulating* their action and the character of flow of their contents. In this case they would be vaso-motor nerves, or nerves of the so-called sympathetic system. In no locality would it seem to be more important, if *as* important, that this regulative action upon the flow of the contents of vessels should exist, than in the pulp chamber amid the tissue which occupied it. But these nerves are always anatomically connected with those of the cerebro-spinal system. Some of the phenomena of inflammatory change, within and seated upon the tooth-surfaces, seemed explicable on no other supposition. This strictly regulative action is unlike the relations of the cerebro-spinal system, not dependent *for its existence* upon any impressions, but is embodied in the very anatomical relation of the nerves to the tissue of the vessels, and impressions only make *a change* in the relation. But this subject must be continued at another time.]

But there is another supposition relating to these dentinal fibrils. This is, that they are fibres of coagulated fibrin. I need not say to my hearers that it seems not worth while to comment on this imagination. I trust, on their behalf, that the day is past when members of this fast learning and rising profession will be found listening gravely to statements of the "geology" of the teeth, or that a structural part of a tooth is an elongated particle of a coagulum of fibrin.

The next point I have to refer to is this,—far more important, at least to the proper posture of our minds upon the growth and structure of dentine, than the preceding subjects—namely, the character of the process of dentification. This is not one of the character of calcification, meaning by that term a *deposit* of calcareous or earthy phosphatic matter. It is not a process of *deposit* or deposition. Nothing could be

more unlike than these two. Deposition consists of the aggregation, particle by particle, of solid amorphous or crystalline matters from solution. It involves neither basis nor matrix, but only some surface upon which these can collect. This process is not even involved in the formation or constitution of any tissue in the body, nor any structure even to the extent of one atom. I hardly need adduce examples of deposition. The "accumulation" or aggregation of tartar is one. The incrustation of earthy matters in boilers is one.

The process of ossification or dentification involves or proceeds upon the previous formation of a soft-solid substance, called a matrix. Within and throughout this substance, the particles of phosphatic lime are incorporated in the process of dentification. The matrix itself is an anatomical form of substance. But this is not a process of the *mingling of two* substances. The matrix is always a substance undergoing nutrition. Like all nutrifying anatomical forms in the body, it is the seat of a separation between certain component particles, and the mass which remains. The places of the retiring particles (water) are occupied by other particles previously surrounding or bathing the mass. *They* nutrify. For those particles which necessarily disunite from the mass, others from its exterior are *incorporated* in it. No feature of a process of separation or precipitation is enacted here. In dentification, it is openly certain that the earliest portion of the process begins within the tooth papillæ, by minute cells, the progeny of special cell-growth, flattened into a number of sides or faces, by mutual compression. These cells incorporate the lime-salts, particle by particle, into their body and substance, forming the enamel. The dentine is formed by a process of incorporation of lime-salts in the matrix. This matrix parts with its least dense or watery particles of composition. The lime-salts are taken up for these, and so the substitution goes on, being an extension of the process of nutrition, until but little of the component substance of the matrix remains, and remains combined with the now hard-solid mass.

In the figure I now point out to you, you observe surrounding one of the dentinal fibrils two minute globular forms. These surround the tubule as if it had been passed through the centre of the globules. These are supposed to be globules of lime in solution—calciferous matter. Kolliker, Czermak, Beale, and others suppose that the tooth is dentified by a succession of these globules passing inward from the pulp cavity, traversing a certain space one after another, or contemporaneously at different points of the early structure, and finally amalgamating. According to this view, these globules glide along like a collar surrounding the fibril, and finally coalesce. This implies that they fill a certain void of interfibrillar tissue; and that the part we have asserted to consist of a soft-solid matrix, is in reality, if not entirely free from tissue-like substances, occupied by nothing which impedes the ingress of these

globules upon their axis. It implies, too, that the tubules exist extending inward and outward, formed long before dentification; and it is between the exterior surface of these, running parallel to each other, that the globular matter is thus deposited.

I confess this theory of formation seems to me not only problematical but impracticable. But it is just here that we feel a need of actual knowledge and how real our destitution is.

[The speaker further explained this process, and pointed out the fallacies which date from our supposing that the tooth, like soft-solid tissues, was continuously nutrified, or continuously lost and gained matter, after it was once built up.]

This fallacy is now shared, without a single exception, by every writer and speaker on the subject of the teeth. But it is not the fact. To be sure, there is no actual withdrawal of the anatomical condition or agents of nutrition which existed during the performance of the process, for this could not be done without destroying the anatomical integrity of the parts. But the process of nutrition, or a continuation and carrying forward of that process by which materials of nutrition were employed in building up the tooth, is suspended or remains in *statu quo*. The only waste the hard-solid tissue, or permanently built form will now undergo, is the waste *of caries or decay*, not the waste contemporaneously with supply, as in nutrition. Much *truth* might be stated upon this point, but it is, in brief, because this nutritive process or supply is no longer proceeding, that the tooth does decay—the hard-solid structure disintegrates particle by particle. Not that this state of want of nutrition is itself a provocative of or induces decay, but because its existence would present a counteractive or preventive effect to the causes of decay to which the teeth are subjected in the many physiological vicissitudes they are subject to. The speaker hoped to be able to speak further on this subject at another time; but said in conclusion that the vascular channels of the teeth were anatomically of such a character as to force us to comprehend that no plastic matter in solution in the blood was supplied by them; but only the more watery and saline ingredients. Hence they exuded only a portion of the mass of ingredients of the plasma or liquor sanguinis, not its fibrin, etc. etc. These latter, therefore, are not transuded into the space surrounding the vessels and tissue in the pulp cavity. These vessels are minute arteries, and do not break up into any anastomosing capillaries or plexus, and hence furnish none of the anatomical conditions of a plastic nutritive fluid properly speaking.

The speaker then referred to a peculiar form of stellate and anastomosing tissue of irregularly alternate broad and narrow fibres, suggesting in its form the idea of anastomosing fluid-bearing tubes, found upon the surface of the fang.

He also exhibited figures of isolated fibrils and of sections of dentine with the fibrils withdrawn, showing the cross sections of ovoid flattened *channels*. He inferred from this the notion that these were dentinal tubes proper antecedent to the process of calcification; but remarked that our observations with reference to this point were too few to qualify us to decide it now.

A vote of thanks was passed to Dr. Browne for his interesting remarks on a subject of so great interest to dentists.

Dr. C. A. Marvin then read the following paper on the subject of the evening:

TEMPORARY FILLINGS.

Mr. President,—As to the utility of temporary fillings, a wide difference of opinion prevails in the profession, some contending that they should never be employed; others that their use is evidence of the best practice and truest wisdom.

There are undoubtedly instances in which the employment of temporary fillings is productive of much good; and, indeed, I believe many wherein the best practicable result is secured through their use.

Every practitioner has experienced the difficulty of effecting a satisfactory operation upon largely decayed teeth in the mouths of children. Various causes conspire to create this difficulty; for example, the size of the mouth, the restlessness of the child, the situation of the cavity, its extreme sensitiveness, or the imperfect calcification of the tooth. Under these conditions, the thorough preparation of the cavity, the perfect preclusion of moisture, the proper insertion of gold, are not always possible. In my judgment, at such times, after making as thorough excavation as can be done, the insertion of a temporary filling is the best practice.

A so-called permanent filling, when imperfectly inserted, is worse than none—and for this reason: the patient, if an adult, considers the tooth safe, and gives no more thought to it; if a child, he is told by his parent that now he is in no danger, and neither parent nor child feel any further concern, until a sudden crashing in of the crown, or a sharp twinge of pain, some day reveals the disagreeable fact that decay has been constantly progressing.

Now, if a tooth is so conditioned that the successful filling of it with gold seems doubtful, a temporary filling answers the following excellent ends:

The parent knows that the tooth is not dismissed finally, that something more is to be done to it. Hence his attention is fixed upon it, and he sees that it is not neglected.

The presence of a well-seated temporary filling protects the cavity from irritation by external influences. It becomes therefore better able to endure the necessary excavation which is yet to be done.

Temporary fillings protect from decay-producing agents. Hence no danger is incurred, no damage done by the delay to fill permanently. While the temporary filling remains perfect the tooth is secure.

This allows time to work its changes upon the child and its mouth. A period of six months will often produce a wondrous change. The tooth is found less sensitive, the patient less apprehensive, the salivary ducts less generous, and the dentist is able to perform an operation which before seemed absolutely impossible.

Beside these advantages, which may perhaps be denominated secondary in importance, there is one other which I deem of the first. There is a class of cavities which we are called to treat that require careful management. I refer to those which reach so near to the nerve as to be extremely painful, not only when operated on, but which are in danger of being injuriously affected after the operation by what are termed thermal currents. This danger is heightened by the introduction of any metal which is a good conductor. Many cases of death of the pulp and subsequent disease have been the result of just such practice. A temporary filling, composed of some non-conducting substance, introduced carefully, will prevent irritation from without, and enable the tooth to adapt itself to its new condition. A few months will sometimes witness astonishing modifications in the condition of things. The tooth seems to have become resigned to its fate, takes its tenant kindly, and lapses into a state of comfortable quiescence.

I will not enter into a discussion, or attempt a minute analysis of the precise change that takes place, by which the tooth becomes less susceptible to injury from the same causes. Certain it is, that a temporary filling does tend to prepare a tooth of the character described to receive and carry a permanent one with greatly reduced danger of subsequent pain or disease.

Another important use of temporary fillings is this. After a pulp has been destroyed and extirpated, or corrupt roots have been treated, and the appearance is favorable, the employment of such a filling will test the condition of the tooth, and this is a matter of no small importance, in my judgment.

It often happens that some inflammation is present, though undiscovered while the cavity remains unfilled; but when perfectly sealed up, the inflammation will betray itself and produce serious results.

I believe in the old maxim, that "an ounce of prevention is worth a pound of cure." And although the doctrine is announced that under the conditions before specified, the tooth should be immediately filled without regard to subsequent results, they being left for such treatment as they may require—mild or heroic—such is not my practice nor belief.

I deem it more humane, wise, and professional, to avert than cure. I would prefer inserting a temporary filling and removing it, if neces-

sary, more than once, to filling the tooth permanently with gold, and then, if inflammation supervene, perforating the alveolus.

These different points can, of necessity, be handled but briefly in a single paper.

As to the material: For strictly temporary purposes, I prefer Hill's stopping or Bevin's filling, these possessing the *sine qua non*—the non-conducting property. They are sufficiently durable for the end they are designed to accomplish, and not enough so to warrant their employment for permanent use.

Tin foil is sometimes recommended for temporary fillings. In my judgment, its use for such a purpose involves a useless expenditure of labor. A filling—temporary or permanent—to be of any value, must be impervious to air and moisture. When a filling of this degree of excellence is made of tin foil, much time and much labor are required, and all the precautions must be observed to keep it dry. When completed, it is not intrinsically a temporary filling at all. It is a good permanent filling, often the best the case can have. No advantage, therefore, arises from the employment of this metal for such a purpose.

The several species of bone fillings, so called, are no favorites of mine. For a sensitive tooth, I consider them dangerous. The sharp pain that follows the insertion of the first installment of the paste, is quite sufficient to sicken unto death the sensitive pulp, producing what we wish to avert.

Their greater solidity than a Hill's stopping is no recommendation, rather the contrary. If it is a *temporary* filling we wish to introduce, we do not look for nor desire permanence. We do not care for more than the requisite degree of solidity. *Enough* is *sufficient.*

Ease and quickness of insertion, the breaking of the air currents, the perfect sealing of the cavity, the prevention of decay, the kind action upon sensitive dentine, and the readiness of removal are qualities possessed by the preparations of gutta-percha, and certainly recommend them for the uses and ends which it is desired to attain.

NOTES FROM DISCUSSIONS OF THE SOCIETY OF DENTAL SURGEONS IN THE CITY OF NEW YORK.

BY J. S. LATIMER, D.D.S.

At a meeting held at Cooper Union, October 23d, 1867, the subject being Acute Peridental Inflammation Supervening the Removal of Dental Pulps, C. E. Latimer, D.D.S., read a paper on Acute Peridentitis and its Causes.

E. A. Bogue, D.D.S., said that the prevalent idea of Dr. Hullihen's method, as it is called, is erroneous. He employed it only in acute inflammation of the pulp, and then with the idea of preserving its vitality by relieving its congested vessels. It was for this, and this only, that he passed a fine drill through into the pulp cavity.

Dr. Atkinson doubted the ability of gentlemen to pronounce upon the vitality of pulps treated in the manner described. Gentlemen who have trouble supervening the removal of the pulp, should leave creasote in the dental canal, without other stopping except at meal-time. This sort of dressing may continue a day or two until the tooth will bear closing up.

Professor R. K. Browne then made some remarks introductory to his course of twelve lectures on Physiology.

At the meeting held November 6th, C. S. Weeks performed the experiment of burning red vulcanite and collecting the vapor of the reduced sulphuret of mercury in a porcelain vessel. With a bit of cotton-wool, moistened with nitric acid, he collected the globules, with which he then mercurialized a piece of sheet brass. He believed that rubber plates irritate the mouth more than metal ones. The dark, almost black color noticed on the lingual surfaces of many plates, he believed due to a slow reduction of the sulphuret.

B. W. Franklin had long been aware that heat would reduce vermilion, but he doubted the reduction in the mouth, claimed by the preceding speaker.

W. C. Horne, D.D.S., was glad to see an experiment, and hoped nothing would be said or done to discourage this sort of illustration.

Dr. Bogue mentioned that he had used red rubber for a regulating plate, during the wearing of which the patient suffered from turgidity of the gums, diarrhœa, and emaciation. The wearing of the plate was intermitted two or three times, with marked improvement during its removal. Black vulcanite was then substituted, with the effect of a speedy return to health. He would not say he was fully satisfied that the vermilion produced the unpleasant effects; but the father of his patient was very confident that the coloring matter was in fault. He mentioned a case of neuralgia cured by treating eight abscessed teeth and making them well. We should always be able to give a reason for the treatment we pursue. He suggested that in applying creasote to inferior molars, it is only necessary to dry the canals and drop the creasote into the pulp cavity, when it will find its own way to the desired points.

C. P. Fitch, M.D., believed we often overtreat, employing powerful escharotics, and unnecessarily and injuriously destroying healthy tissue. When inflammation follows the removal of a dental pulp, warm water is a very good dressing. In cases of suppuration of the pulp, the canal should be cleansed, and then filled with a concentrated solution of the permanganate of potassa, which is a better antiseptic than creasote. Some cases may be relieved by opening through the apex with a broach, and applying in the canal tinct. aconite root. Antimonium cruden, a homœopathic remedy, also answers well in such cases.

W. B. Hurd, D.D.S., uses chlorinated lime for cleansing roots of ab-

scessed teeth, and finds that in nine cases out of ten no further treatment is required. After thoroughly cleansing the roots with the chlorinated lime, he fills immediately. This method he applies to acute and chronic cases alike. He sometimes finds cases he cannot cure.

C. A. Marvin, D.D.S., fills temporarily with cotton, when he has any doubt about having removed all the pulp. For a permanent filling in canals, he invariably follows the pellets of cotton and creasote in the apices with gutta-percha.

C. D. Allen, D.D.S., had tried "Chase's specific," with a good degree of success.

John Allen, D.D.S., relieves acute cases by local bleeding or leeching.

November 20th.

John S. Fisk read a paper on Extracting Teeth, the subject of the evening.

Prof. R. K. Browne then gave the first lecture of his course on Physiology.

Dr. Atkinson followed the lecturer with some complimentary remarks, and then said, with reference to extracting teeth, that these organs very rarely required removal. He claimed that a very large proportion of the extracting done by dentists, is wicked and wanton mutilation, prompted largely by love of pecuniary gain. The excuse that, if we do not extract the tooth, some one else will, and we lose the fee, is unworthy and paltry in the extreme. Probably ignorance with respect to the importance of the dental organs and of the consequences of their unnecessary removal, account for much of this sort of malpractice. He hoped Professor Browne's lectures would do something to dispel the cloud of ignorance upon this subject. Parents, guardians, and children require to be taught the value, use, and means of preserving the natural teeth, and this duty devolves upon dentists. He denounced the wholesale use of anæsthetics, and denominated them Satan's agents for mutilating men.

B. W. Franklin said—We have people come to us who are too poor to pay for having their teeth saved. If we can and will serve such persons gratuitously, we may do great good; but he feared dentists were not largely given to this practice.

O. A. Jarvis thought common sense ought to have something to do with our discussions and our practice. In a city like New York, a dentist would soon be overrun with non-paying patients if he undertook an eleemosynary practice.

When satisfied that a tooth has lost its peridental membrane, he advised its removal, believing that it could not be made healthy.

W. B. Hurd, D.D.S., had extracted teeth occasionally for many years,

and felt no compunctions at continuing the practice, using his best judgment in discriminating and his utmost skill in trying to save.

December 4th.

C. S. Weeks read a paper on the Causes of Dental Caries (already published), which, with Professor Browne's lecture, occupied the evening.

December 18th.

Dr. Atkinson ascribed dental caries to uncleanliness. The celsi and the approximal surfaces of the teeth require especial attention. He urged members to be faithful in cleaning and polishing teeth. They should be taken tooth by tooth and made *perfectly clean and bright.* Our patients are better able to appreciate faithful work and to pay for it than we generally believe.

J. S. Latimer suggested that the Committee on the Preservation of the Natural Teeth produce a pamphlet on the subject committed to them, and that the Society publish and furnish it to dentists for gratuitous distribution among the public. Probably in no way can we do more to prevent dental caries than by some such method of disseminating the requisite knowledge.

The lecture on Physiology occupied the balance of the evening.

January 15th, 1868.

J. S. Latimer inquired for information concerning the imperfections of the celsi. Here is a question looking toward the bottom of the subject of dental caries.

Dr. Atkinson spoke of the points of dentification, which are as numerous as the cusps of the teeth. The imperfect fusion of the enamel between these points of calcification is due to inability to follow the type caused by degeneracy, and not by want of lime in the food eaten. He had seen good teeth in the mouths of people who subsist mainly on cheese and macaroni. He could not agree with those who charge caries almost exclusively to the removal of the bran from the flour of which bread is made. He claimed that chemical food had been a failure, from Liebig down to the present moment. He admitted the necessity for coarse food as an irritant or titillator of the mucous coat of the intestinal canal. The foods of all nations furnish abundant supplies of lime.

C. S. Weeks believed cheese to be rich in lime-salts. He admitted the useful office performed by the coarser foods mentioned by the preceding speaker, but claimed that the analysis of grain proved that the bran contained the phosphate of lime, of which the tooth is mainly composed.

B. W. Franklin dissented from Tomes' objections to the employment of the brush in cleansing the teeth. Fine flour induces dyspepsia for want of the coarser and yet less nutritious portions of the grain.

C. P. Fitch, M.D., thought the fault more in defective assimilation than in defective food. Dietetics cannot produce healthy teeth. He was not satisfied that it is positively known that the points of the cusps of teeth are the points of calcification.

January 29th.

C. S. Weeks read a paper on Bases for Artificial Teeth, in which he deprecated the use of vulcanite.

Professor Browne's lecture on Connective Tissue contained remarks on some mooted points with reference to the teeth. He claimed that dental caries is not commenced by the loss of the earthy salts, but of the gelatinous. The dentinal fibrils, he claimed, are neither coagulated liquor sanguinis nor fibrin, but intercellular matter. There are no more nerve fibres in the dentine than in cartilage. Beale has been unable to find nerve fibres in dentine, though he has sought with the highest powers now employed.

February 12th.

B. W. Franklin had found the Simpson rubber to lack the requisite hardness. The withdrawal of the application for injunction against an Albany dentist for using the Simpson gum was made because the Vulcanite Company was not ready to meet the answer of the infringer. He had succeeded in getting a solder for aluminium, and had made some improvements in manipulating the metal, by which he was enabled to produce three plates on the aluminium in the time required to make two on vulcanite. He promised to present specimens at a future meeting.

Dr. Fitch denied that rubber plates act otherwise than mechanically upon the mouth. They dam up the follicles, by which the mucus is retained until it becomes acrid, and produces sore mouth. He stated that Dr. Keep, of Boston, had formerly employed aluminium for making dental plates, but had abandoned it because it would not withstand the fluids of the mouth.

Mr. Heindsman exhibited a partial plate of aluminium soldered with an alloy of the same metal. He did not know whether the solder would be decomposed by the oral fluids.

Dr. Simons, of Boston, being called upon for remarks, stated that though a stockholder to a small extent in the Vulcanite Company, he had decided to abandon the use of rubber as a base, and to employ gold and aluminium instead. He finds that full plates of rubber have lasted, on an average, six years in his practice.

February 26th.

J. S. Latimer said, with reference to the subject of the evening, that he had little trouble in greatly improving the color of dark teeth, by means of the hypochlorite of lime, but that he had been unable to se-

vent a return of the color. He was at a loss to explain the return of the unpleasant shade, and hoped to get some light during the meeting.

C. E. Francis, D.D.S., first fills the root permanently, and then fills the crown with chalk and a solution of chlorinated soda. He had not much faith, but still continued to try. The teeth generally get yellowish-gray afterward.

Dr. Atkinson had sometimes failed to permanently better the shade of darkened teeth. He bleached by placing crystals of oxalic acid in the tooth, and then applying a drop of water on cotton. When the color returns, the failure is generally ascribable to defect in the filling. Did not think creasote could have any agency in causing the failure, as he had never filled a tooth without wetting the cavity with creasote before filling. Has been many times called upon to bleach teeth having living pulps. The gentlemen who employ arsenious acid for obtunding sensitiveness in dentine will keep us supplied with cases for bleaching. He believed the bleaching property of the oxalic acid much stronger during the solution of the crystals than afterward.

A few minutes suffice for the bleaching. If the tooth is not decidedly improved in thirty minutes, he sends the patient away with the tooth open.

C. E. Latimer, D.D.S., was cautious how he applied acids to teeth, knowing their destructive action. He had that day bleached a tooth with hypochlorite of lime placed in the cavity, and moistened with acetic acid. The process required about thirty minutes. He did not wet the cavity with creasote, but filled at once. Had met with badly colored teeth having living pulps. He digressed to say that he had tried the cantharidal collodion for the relief of acute periodontitis, and was pleased with the result. He had been induced to try it by the recommendation of Prof. Taft. In its application, it is only necessary to dry the gum over the affected tooth and paint with the collodion. A blister is soon raised upon the gum. He had made some by mixing tinct. cantharides and collodion, equal parts. Of course the parts must not be permitted to get wet until the ether has evaporated.

Dr. Marvin had recently been trying Dr. Atkinson's method of preserving the vitality of exposed dental pulps, and with very good prospects of success.

March 11th.

The following officers were elected:

President, J. C. Robbins; *First Vice-President*, Frank Abbott; *Second Vice-President*, Chas. D. Allen, D.D.S.; *Recording Secretary*, J. S. Latimer; *Corresponding Secretary*, W. H. Allen, 18 West 11th St.; *Treasurer*, W. C. Parks, D.D.S.; *Librarian*, T. H. Burras.

John M. Crowell was appointed Assistant Secretary, with the duty of reporting the proceedings of the Society's meetings.

NEW YORK STATE CONVENTION OF DENTISTS.

A State convention of dentists was held in the City of Utica, New York, December 18th and 19th, 1867, consisting of delegates representing almost every society of the State of New York, for the purpose of considering the subject of some legal enactment to regulate the practice of dental surgery. A paper upon the life and death of the late Dr. Robert Nelson, of Albany, was read by A. Westcott, M.D., D.D.S., of Syracuse; and after eulogistic remarks from Drs. Foster and Rogers, of Utica, from Dr. Whitney, of Buffalo, and several others, appropriate resolutions were, on motion of Dr. Foster, unanimously adopted by the convention.

A committee of three, consisting of Drs. A. Westcott, B. F. Whitney, and L. W. Rogers, was appointed for the purpose of considering and devising some appropriate legal enactment applicable to the dental profession.

The committee drafted a petition to that effect, which was signed by over 800 persons living in different parts of the State, and was then presented to the legislature, where the measure met with such favor in the senate as to cause the passage of a bill in accordance with the petition.

The accompanying report, taken from a Syracuse paper, claims attention in connection with the above:

"At the semi-annual meeting of the Onondaga County Medical Society, Dr. A. Westcott, of this city, introduced the subject of legalizing the dental profession, and a resolution was unanimously passed by this society, not only concurring in the movement, but adopting as its own the prayer of the petitioners to the legislature for this purpose. On the 4th inst. Dr. Westcott presented the subject to the State Medical Society, of which he was made an honorary member *pro tem.*, and the following preamble and resolution were unanimously adopted by that body, the most sterling and important Medical Society in the United States. This action shows the appreciation in which dental surgery is now held by the medical profession. The resolution of the State Society is as follows:

"*Whereas*, The dental profession of the State of New York, now numbering about two thousand practitioners, are about to petition the legislature of the State for such legal enactments as will tend to regulate the practice of dental surgery, and to mark some distinction between the meritorious and skillful, and the ignorant pretender, and to give this profession a legal recognition, it is by this, the Medical Society of the State of New York,

"*Resolved*, That this move on the part of the dental profession of this State, to procure such general laws for its protection, as now pertain to the medical profession, meets with our hearty approval, and that we hereby join in the prayer of their petition for this purpose."

HARRIS DENTAL ASSOCIATION OF LANCASTER.

BY W. N. AMER, LANCASTER, PA.

A STATED meeting of the Harris Dental Association of Lancaster, Pa., was held February 6th, at the office of the Secretary.

The essayist of the evening, Dr. M. H. Webb, read a paper upon the "Dental Tissues." Dr. McCalla presented a correspondence between Dr. Brenizer, President of Lebanon Valley Dental Association, and himself, in relation to a contemplated union meeting of the two societies, which resulted in the adoption of a resolution to meet the Lebanon Valley Dental Association at Litiz Springs, Lancaster Co., on the second Thursday in July next. The subject of "Phénol Sodique as a Hæmostatic" was introduced by the president, and led to a very interesting discussion upon the subject of styptics generally.

The adamantine base was next introduced, and a specimen of the work exhibited, with one of Dr. Moffit's flasks. The prevailing opinion was that the base, if properly manipulated, is a decided improvement in the style of work known as the "Cheoplastic process."

NORTHERN OHIO DENTAL ASSOCIATION.

THE annual meeting of the Northern Ohio Dental Association will be held in the Lecture-room of the Charity Hospital Medical College, at Cleveland, on Tuesday, May 5th, 1868, at 10 o'clock A.M. Subjects for discussion: 1. Reading of Essays. 2. Manipulation of Gold Foil in filling Teeth. 3. Fillings of different metals approximating each other. 4. Use of the Mallet in filling. 5. Improvements in Dental Mechanism.

B. F. ROBISON, *President.*

C. R. BUTLER, *Corresponding Secretary.*

MERRIMACK VALLEY DENTAL ASSOCIATION.

THE semi-annual meeting of the Merrimack Valley Dental Association will be held in the reception-room, Huntington Hall, Lowell, Mass., on Thursday, May 7th, at 10 o'clock A.M. G. A. GERRY, *Rec. Sec.*

EDITORIAL.

SIMPSON RUBBER VERSUS GOODYEAR RUBBER.

THE *American Journal of Dental Science* gives the following result of a recent suit in the U. S. Circuit Court of the Northern District of New York:

"In the case of Henry B. Goodyear Dental Vulcanite Company *vs.* Dr. J. Brockway, of Albany—which was a suit for using hard rubber for dental purposes, before the U. S. Circuit Court for the Northern Dis-

trict of New York—an application for a preliminary injunction to re strain the doctor from further use of the article pending the suit was set down for a hearing on Tuesday, January 27th, at Albany. The motion was resisted by defendant on the ground that he was using the Simpson dental rubber, and not the Goodyear rubber, or any infringement of it. Chas. F. Blake, Esq., of New York, appeared for the owners of the Goodyear patents, and H. T. Blake, Esq., of Bridgeport, for the owners of the Simpson patent. Affidavits had been prepared on behalf of the defendant, disclosing the fact that the Simpson rubber is entirely different, both as a material and in its mode of manufacture, from the Goodyear article, upon the exhibition of which the counsel for the complainants notified the court that he should decline to press the motion at present, as he had intended, and requested and obtained an indefinite postponement of the whole matter."

BIBLIOGRAPHICAL.

On Symmetry and Homology in Limbs. By Jeffries Wyman, M.D., Boston.

A pamphlet, with the above title, reprinted from the proceedings of the Boston Society of Natural History, has been received from Professor Wyman, of Harvard University, in which the author treats this important subject with characteristic ability and originality, and will, no doubt, give a new impulse to a field of investigation which has been enriched by the genius and labor of Oken and Owen, and in which every philosophical anatomist feels a deep interest, as it leads to, and confirms the recognition of the great general law, that, notwithstanding the numerous diversity of forms observable among organized beings, there exists throughout a conformity to a general plan, an archetype or ideal model. As Professor Wyman justly remarks, "*Unity* of plan in the structure and composition of animals is much more likely to prove true than *diversity*." The recognition and enforcement of this fact, by appropriate illustrations drawn from every direction bearing upon the subject, on the part of able instructors, will tend greatly to simplify the study of anatomy, human and comparative, and facilitate investigation in such direction. Regretting that want of space prevents the presentation of a number of interesting points that attracted attention, the following extract is made on account of its practical bearings upon our specialty:

"The symmetry of disease, to which attention has of late years been called, also helps to sustain the idea of fore and hind symmetry. Certain maladies, as psoriasis, leprosy, syphilis, etc., not only attack corresponding or symmetrical portions of right and left parts, but also of fore and hind parts. Certain skin diseases attack the backs of the hands and feet, or the palms and soles, or the elbows and knees. The

earthy deposits in the arteries show a similar tendency to symmetrical distribution. Such instances, however, are quite rare in comparison with the vast proportion of diseases in which no such tendency is apparent. They nevertheless tend to show that homologous parts, either on the right and left, or fore and hind parts of the body, have such a constitution that they are more amenable to the influence of a given disease than other parts."

Years ago I directed attention to this fact in connection with the decay of teeth, showing that symmetrical disease is so constant, that when a tooth on one side of the mouth gives unmistakable evidence of decay, it is reasonable to infer that the corresponding tooth on the opposite side will be found affected, and that the remembrance of this fact proves an invaluable aid in diagnosing the general condition of the teeth under examination. And as a sequence to this, through the prompt performance of necessary operations, decay can be arrested in its incipient stage, and painful sensations and the possible loss of valuable organs averted. Like all general rules, this one, of course, is liable to variations. J. H. McQ.

SELECTIONS.

BRITISH JOURNAL OF DENTAL SCIENCE—JANUARY, FEBRUARY.

"EXTIRPATION OF THE PULP. By W. H. WAITE, D.D.S.—In a preceding paper the subject of 'Devitalization' has been referred to as a process which becomes requisite in the majority of those cases in which decay has advanced to the pulp cavity. Some eighteen months' further experience, extending over an average of four to six such cases weekly, confirms my belief in the opinion suggested in that paper, viz., that devitalization is the safest practice in all cases where there has been spontaneous pain, and in a large proportion of instances in which the exposure has not been attended with pain, such as an accidental exposure in excavating, etc. After all that has been advanced relative to the success of capping exposed pulps, it may appear presumptuous to question the soundness of that practice; but, leaving aside the practical difficulties presented by this operation, and confronting the philosophy of the process, we are met by the choice of three conditions: 1st, the cap must touch the exposed portion of pulp, and, as a foreign body, necessarily produce irritation and inflammation of that organ; or, 2d, if the cap is not in contact, there must be some intervening body, whether gas or air, or any other substance, and so irritation, chemical action, etc. etc.; or, 3d (if such a thing were possible), there must be a vacuum underneath the cap, in which case a small portion of pulp will be forced through the aperture in the dentine, and swelling out underneath the cap, become irritated by contact, and being constricted in its passage from its own cavity, will inflame and die. In either of these conditions we may confidently anticipate death of the pulp at no great length of time after the operation. A small percentage of cases, chiefly found in the hard yellow teeth of the bilious temperament, may survive for a considerable period to the satisfaction of operator and patient; but these are insufficient to justify the general adoption of the operation. *Devitalization* as the rule, *Capping* as the exception, would appear the most

judicious method of dealing with exposed dental pulps. After *Devitalization* we have *Extirpation*, an operation which, marvelous to relate, is considered unnecessary by some who assume to be authorities in such matters; these philosophers have evidently never thought out the pathological conditions which must arise sooner or later from leaving a devitalized pulp sealed up in a tooth, but they have it appears observed that teeth so left are liable to give trouble, and they have shrewdly guessed that it must proceed from the evolution of 'gas' within the pulp cavity; they imagine, further, that if they can contrive to afford a vent for this gas, and also for any discharge that may come from some source or other (which in their minds is not very clearly defined), all will be well. And so, having first devitalized the delicate and highly organized pulp, they proceed to insert an amalgam plug in the tooth, sealing up the dead pulp, and then, to avoid the consequence of such malpractice, they drill a small hole somewhere about the margin of the gum, through which it is intended that the foul gas generated by the decomposition of the pulp shall perpetually escape, to impart a delightful aroma to the breath of the patient, and through which also it is designed that the disgusting matter resulting from the decomposition shall be constantly oozing, to bathe the neck of that and adjoining teeth with a refreshing fluid, most irritating and destructive to the soft parts and periosteum. This is the beneficent intention; but what are the facts? Why, in full half the cases this beautiful contrivance for rectifying the bungling operation, the small hole becomes stopped by food, mucus, or not infrequently tartar; its purpose is defeated. The tooth, having no vent, speedily assumes the symptoms of periostitis, rapidly followed by alveolar abscess, and in the impatience of acute suffering the patient rushes off to the nearest tooth-drawer, and sacrifices a valuable tooth on the shrine of incompetency in dental operations. Most frequently it happens that the practitioner, whose laziness or inability has caused all the mischief, remains in blissful ignorance of the issue, and lays the flattering unction to his breast that his mode of treatment never fails of success, etc. etc.

"It is, however, difficult to conceive of a more slovenly style of proceeding within the whole range of operative dentistry than that which has been described, and do what we may to raise the character of our profession by strenuous enactments or political means, it is utterly impossible to secure the confidence and respect of the appreciative public, unless we demonstrate the ability to perform our operations *thoroughly*, and in such a manner as shall compel them to regard us as their benefactors.

"There is yet another method adopted for the purpose of avoiding this very necessary operation. It is, 'after removing the arsenical application, and having cleared and prepared the outer cavity, to place a piece of gutta-percha bathed in carbolic acid against the entrance to the pulp cavity, leaving an opening for pus, etc. to pass through the centre of the plug.'

"The process of dipping gutta-percha in carbolic acid is intended probably to invest it with a magic charm, that shall suspend the tendency to decomposition within the pulp cavity, since it is hard to conceive of any other purpose in using it; but, strange to say, this is not believed in by those who employ such treatment, for they 'leave an opening for pus,' etc., proving that decomposition is anticipated in defiance of the carbolic acid. The intention of the gutta-percha is likewise rather obscure. Is it as a medium for conveying the carbolic acid? If so, a lock

of cotton would be more serviceable. Is it for the purpose of interposing a non-conductor between the filling and the pulp? If the pulp is dead, this can hardly be necessary. Should an amalgam plug be inserted over the gutta-percha, the results must be highly satisfactory! The opening for pus, etc., which (after this mode) is left through the plug, must be very liable to get stopped up, especially on masticating surfaces. And what then? Then we are informed that the patients are instructed to use a soft needle, frequently passing it through the aperture to maintain a free vent—an injunction which, judging from the average intelligence and care of patients in relation to teeth which are not absolutely painful, is likely to be very rarely obeyed. All this uncertainty of success, and probability of failure, is incurred to avoid the performance of an operation which may be executed with comparative ease by any ordinarily patient and persevering operator, so simple and so sure that there is absolutely no excuse for neglecting it. A variety of instruments for extirpating the dental pulp, some of them exceedingly delicate and beautiful, merely as works of art, are manufactured by S. S. White, and other American instrument makers (a stock of these is generally on view at Rutterford's).

"Perhaps the most useful and most durable of these is the simple soft broach, exceedingly fine, with a sort of barb or hook at the end.

"After withdrawing the arsenical application, it is desirable, first of all, thoroughly to clean out and shape the outer cavity, as it is next to impossible to see well while the walls of the cavity are covered with dark-colored dentine. When all is clean, a very fine untempered probe may be passed into the bulbous portion of the pulp, to explore as to the completeness of devitalization. Assured of this, a sharp chisel, or large-size rose drill, according to circumstances, may be used to open out the pulp cavity, which should be obliterated by making its walls continuous with those of the outer cavity. Some portion of the bulb or pulp will be cut away in this process, perhaps all of it; then a fine probe should be passed into each of the root canals, to ascertain the condition of each fibre of the pulp contained therein. These proving tolerably insensible, the barbed broach is next taken up and gently insinuated into the canal, keeping it as much as possible next the walls of the chamber, slipping it up beside the pulp, until it reaches the top, then rotate two or three times gently, and apply traction. If there be any resistance, well and good—a little care will remove the whole fibril; but if there is no resistance, work the broach about a little, rotating it now and again until it takes hold. The buccal canals of upper molars are sometimes too constricted to admit even the very finest probes, and in such cases the operation is impracticable; but if diligently performed on the palatal root, the extremely minute fibril in the buccal roots may be left without much fear. Those who have never removed the pulps of teeth in this way, will be astonished at the amount of tissue which may be found in the root canals, particularly of young teeth. Extirpation is painless where devitalization has been thorough; in other cases the severance which takes place at the foramen of the root is accompanied by a sharp twinge of a moment's duration, followed by slight hæmorrhage that should have free course through the canal until it ceases. Success in this delicate operation depends principally on two things. First of all, free access to the base of the pulp cavity. Secondly, patience in manœuvring with the pulp until it is entirely withdrawn. Both these are within our reach."

PERISCOPE OF MEDICAL AND GENERAL SCIENCE IN THEIR RELATIONS TO DENTISTRY.

BY GEO. J. ZIEGLER, M.D.

On the Function of the Saline Constituents of Food. By Dr. Letheby.—"The *saline* or *mineral* constituents of food are largely concerned in the metamorphosis of matter; and, perhaps, this is their sole function. It is a specialty of these substances to give a soluble form to the plastic constituents of food, and of the animal tissues. They are, therefore, concerned in the phenomena of digestion, absorption, sanguification, assimilation, disintegration, and secretion. In truth they are the chief, if not the only, media for the transference of organic matter from place to place in the animal body—being on one hand the purveyors of nutrient materials into the system, and on the other the carriers of effete substances out of it: besides which, it is very probable that they are the agents whereby liquid colloidal forms of nutriment are changed into solid or pectous, as in the formation of solid tissues from the blood. In the case of digestion and absorption the plastic elements of our food, as albumen, fibrin, gelatin, etc., are not of themselves capable of dialysis, or of passing through the walls of the alimentary canal; and, therefore, absorption must be assisted by some physical agent. This agent is the highly diffusive acids and salts, which are secreted so freely into the stomach during digestion; and it is very probable that they not only effect a solution of the proteinaceous matter of food, but by converting it into peptones, as Lehmann expresses it, they also change the molecular form of the material, and make it pass from an unabsorbable colloid, into a highly diffusive crystalloid. If, indeed, it be, as Mr. Graham supposes, that a colloid molecule is but a group of smaller crystalloids, the action of the saline and acid constituents of the gastric juice might be to break up the larger colloid molecule, and thus give it the property of diffusion and absorption. An opposite condition of things would occur in the alkaline blood, whereby the colloid molecule would regain its structure, and lose its diffusive tendency; but coming to the tissues, where an acid condition of the fluids again exists, it once more changes its molecular structure, and quits the blood to serve the purposes of nutrition. The exact nature of the phenomena that occur when the liquid nutrient matter which thus escapes is changed into solid tissue is unknown to us; but there is good reason for believing that it is no more than a molecular movement effected by the agency of saline matter. In the case of certain structures which contain more than a common amount of mineral salts, this is unquestionably so; for it occurs in the consolidation of the spiculæ of sponges, the calcareous tissues of polypes, the hard dermal structures of the radiata, mollusca, crustacea, etc., and in the calcareous deposits of bone, teeth, tegumentary scales, egg-shells, etc. of the vertebrata. In all these instances the secreted matter must first have been crystalloidal, or it could not have been secreted; it then takes the form of a liquid colloid or jelly; and, finally, by a further molecular movement, it passes into the condition of a pectous solid—the saline constituents, according to their nature and proportion, determining the degrees of hardness.

"Again, the removal of effete matters, and worn-out tissues, is undoubtedly effected by the agency of saline substances; for, during the processes of oxidation, acid compounds are produced, which, by acting chemically on the saline constituents of the animal fluids, give them a solutive power on plastic matters, and thus enable them to remove the debris of worn-out tissue.

"As to the special functions of the several saline constituents of food, little can be said; but it is a remarkable fact that the *alkaline or basic phosphate of soda* is invariably found in the blood, while *acid phosphate of potash* is the chief constituent of the juice of flesh. Most likely the former is concerned in preserving the liquid colloidal condition of albumen and fibrin, and so keeping them from being lost by secretion, while the latter is engaged in an opposite duty. The alkalinity of the blood also helps in the oxidation of organic matters; and as the basic phosphate of soda is endowed, like an alkaline carbonate, with the power of absorbing carbonic acid, it is the chief agent whereby this compound is removed from the system. This is a remarkable property, and is one of the chief uses of basic phosphate of soda in the blood. In point of fact, when it is not there in sufficient quantity to perform this function it is replaced by an alkaline carbonate. We find this to be so in the blood of herbivorous animals, where the proportions of the two salts are the reverse of what they are in man, and carnivora. Some notion may be formed of the relative importance of the saline matters of the blood by reference to this diagram from Liebig.

PERCENTAGE COMPOSITION OF THE MINERAL MATTERS OF BLOOD.

	Man.	Pig.	Dog.	Fowl.	Sheep.	Ox.
Phosphoric Acid......................	31·79	36·50	36·82	47·26	14·80	14·04
Alkalies..................................	65·66	49·80	55·24	48·41	55·79	60·00
Alkaline Earths.....................	3·33	3·80	2 07	2·22	4·87	3·64
Mineral Acids and Oxide of Iron	9·22	9·90	5·87	2·11	24·54	22·32
	100·00	100·00	100 00	100·00	100·00	100·00

"And in those cases where the phosphoric acid is deficient, it is replaced by carbonic acid. In man, for example, the quantity of combined carbonic acid in the ashes of the blood is only 3·78 per cent., whereas in the calf it is 9·85, and in the sheep 19·47 per cent., so that in all cases the alkalinity of the blood remains the same.

"The *salts of potash* in the juice of flesh have, no doubt, an equally important duty to perform, although of an opposite character; for while the alkaline phosphate of soda in the blood prevents the transudation of nutrient matter, the acid phosphate of potash in the muscular fluid promotes it; and thus it is concerned in nutrition and in the solution of worn-out tissues.

"*Earthy phosphates*, especially *phosphate of lime*, are, perhaps, the agents for the consolidation of tissue; for not only are they present in the hard structures of the body, as the bones and teeth, but they also enter into the composition of flesh.

"And not less important in the morphological functions of the animal body is the presence of *common salt*. It is a large constituent of every one of the secretions, and forms about half the total weight of the saline matters of the blood. Unlike the phosphates, however, it does not enter into the composition of tissue, but seems to be only a medium of absorp-

tion and secretion, and so necessary is it for this purpose, that it is not possible to alter, to any large extent, its proportion in the blood. If we drink water containing but little common salt in solution, it does not permanently dilute the blood, but passes off immediately by the kidneys; and if we try to increase the amount in the blood by drinking solutions of salt, as sea water, it refuses to be absorbed. This normal proportion of it in the blood is evidently a physiological necessity, which the conditions for diffusion imperatively demand. It is a curious fact, also, that common salt has the faculty of forming crystallizable compounds with most of the unorganized and effete constituents of the body. May it not, therefore, be an important agent of diffusion, and be thus concerned in the phenomena of absorption and secretion; for as colloidal matters—albumen and fibrin—cannot pass through the walls of the intestines, or the blood-vessels, it may well be that through the agency of common salt and the free acid of the gastric and muscular juices, they temporarily assume a crystalloidal condition, and are thus absorbed or secreted?

"The constant presence of common salt in the secretions, and the necessity for it in due proportion in the blood, indicate the importance of a proper supply of it with the food. We perceive this in the instinct of animals, and in our own craving for it when it does not exist in sufficient quantity in the food. Animals, in fact, will travel long distances, and brave the greatest dangers, to obtain it. Men will barter gold for it; indeed, among the Gallas, and on the coast of Sierra Leone, brothers will sell their sisters, husbands their wives, and parents their children, for salt. In the district of Accra, on the gold coast of Africa, a handful of salt is the most valuable thing upon earth after gold, and will purchase a slave or two. Mungo Park tells us that, with the Mandingoes and Bambaras, the use of salt is such a luxury, that to say of a man 'he flavors his food with salt,' is to imply that he is rich; and children will suck a piece of rock salt, as if it were sugar.

"The experiments of Boussingault have shown that, although salt mixed with the fodder of animals, does not much affect the quantity of flesh, fat, or milk obtained from them, yet it seriously affects their appearance and general condition; for animals deprived of salt, other than that contained naturally in the food, soon get heavy and dull in their temperament, and have a rough and staring coat. Reulin states that animals which do not find it in their food or drink, become less prolific, and the breed rapidly diminishes in number. This is confirmed by Dr. Le Saine, who says, in his prize essay on salt, that it increases the fertility of the male, and the fecundity of the female, and it doubles the power of nourishing the fœtus. During the period of suckling, also, salt given to the mother renders the milk more abundant and more nutritious. It likewise accelerates growth, and gives a finer condition to the skin; and the flesh of animals fed with it is better flavored, and more easily digested than that of animals which do not partake of it. In barbarous times the most horrible of punishments, entailing certain death, was the feeding of culprits on food without salt; and in the experiments of the French academicians, flesh deprived of its saline constituents by being washed with water, lost its nutritive power, and animals fed on it soon died of starvation. Even after a few days with such a diet, the instincts of the animals told them it was worthless as food; indeed, for all purposes of nutrition, it was, as Liebig says, no

better than the eating of stones, and the utmost torments of hunger were hardly sufficient to induce them to continue the diet. There was plenty of nitrogenous matter in the food, but there was no medium for its solution and absorption, and hence it was useless.

"The *oxides of iron*, and their homologues, the *oxides of manganese*, are largely concerned in the processes of sanguification and oxidation. They enter into the composition of the globules of the blood—manganese being the chief mineral constituent of the corpuscles of white-blooded animals, and iron of red. In fact the coloring matter of the blood disks (cruorin), as well as that of the muscles (myochrome), is a compound of iron and albumen (globulin), which has a remarkable property of absorbing oxygen when exposed to the air, and of giving it out again in the presence of reducing agents. In the one case it acquires an arterial tint, and in the other a venous; and the spectrum informs us that these two conditions of it are easily assumed—one by the presence of atmospheric oxygen, and the other by decaying organic matter. It is hardly to be doubted that these are the conditions of it in blood—the bright red oxidized cruorin being the form of it in arterial blood, and the dark reduced variety of it in venous. The functions, therefore, of both cruorin and myochrome are entirely of a respiratory nature; for, in the former case, it is the medium whereby oxygen is absorbed from the air in the lungs, and is carried with the blood disks throughout the body, and in the latter it may be the agent of intestinal oxidation.

"Lastly, there is a mineral constituent of our food, *silica*, which enters into the composition of all the tegumentary appendages. Its presence is not of so much importance to us as to the lower animals, whose warmth is retained by a natural covering of hair or wool or feathers. In the case of birds, indeed, the quantity of silica in the feathers is very considerable, and Gorup-Besanez has described its physiological relations.

"As to the proportions of mineral substances required in the food it is difficult to speak. Dr. Edward Smith says that an adult man requires daily from 32 to 79 grains of phosphoric acid; from 51 to 175 grains of chlorine (equal to from 85 to 291 grains of common salt); from 27 to 107 grains of potash; from 80 to 171 of soda; from 2·3 to 6·2 of lime; and from 2 5 to 3 of magnesia. According to Mr. Lawes, a very small portion of these salts is retained in the system; for in fattening pigs he found that of every 11 lbs. of mineral matter contained in the food only 12 ounces were stored up in the body, and this was chiefly the earthy phosphates, all the rest being either unabsorbed, or else used in the work of absorption, assimilation, and secretion. In most cases, therefore, there is sufficient saline matter, excepting common salt, in all ordinary food; but for all this, the presence of it in the water we drink is not an unimportant question. Four-fifths of the earth's surface are composed of calcareous strata, which yield water that is more or less rich in carbonate and sulphate of lime; and it may well be that this is a wise provision for the supply of these salts to the animal system. As Mr. Johnston has truly observed in his 'Chemistry of Common Life,' 'The bright sparkling hard waters which gush out in frequent springs from our chalk and other limestone rocks, are relished to drink, not merely because they are grateful to the eye, but because there is something exhilarating in the excess of carbonic acid they con-

tain and give off as they pass through the warm mouth and throat; and because the lime they hold in solution removes acid matters from the stomach, and thus acts as a grateful medicine to the system. To abandon the use of such a water, and to drink daily in its stead one entirely free from mineral matter, so far from improving the health, may injure it;' in fact, the water of a country may determine the diet of its inhabitants. The soft waters of the lakes of Scotland, for example, may have had something to do with the choice of brown meal; and but for the calcareous waters of Ireland the potato could not have become a national food."—(*Med. Press and Circ.*)

"*Yearly Food of one Man.*—From the army and navy diet scales of France and England, which of course are based upon the recognized necessities of large numbers of men in active life, it is inferred that about two and one-fourth pounds avoirdupois of dry food per day are required for each individual; of this about three-fourths are vegetable and the rest animal. At the close of an entire year, the amount is upwards of eight hundred pounds. Enumerating under the title of water all the various drinks—coffee, tea, alcohol, wine, etc.—its estimated quantity is about fifteen hundred pounds per annum. That for the air received by breathing may be taken at eight hundred pounds. With these figures before us, we are able to see how the case stands. The food, water, and air, which a man receives, amount in the aggregate to more than three thousand pounds a year; that is, to about a ton and a half, or more than twenty times his weight."—(*From Things not Generally Known.*)

"*The Tongue* is not an indispensable organ of taste, as is commonly supposed. Blumenbach saw an adult, and in other respects a well-informed man, who was born without a tongue. He could distinguish, nevertheless, very easily the tastes of solutions of salt, sugar, and aloes, rubbed on his palate, and would express the taste of each in writing."—(*Ibid.*)

"*Poison of Nicotine.*—Smokers, by inhaling the fumes of tobacco, introduce into their system a certain quantity (though small) of poisonous matter, or nicotine. When pure, its acrid smell slightly resembles that of tobacco; but when volatilized by heat, it throws out vapors which are so oppressive that breathing becomes difficult in a room where a drop of the liquid has been spilled. M. Orfila killed many dogs by applying five drops of nicotine on their tongues; with twelve drops death ensued in twelve minutes. Two drops applied to the tongue of a cock caused death almost instantaneously. Nicotine can be detected as easily as mineral poisons; and when Gustave Foignies was poisoned by the Count Bocarmé, a few years since in Belgium, with nicotine, it was detected by M. Stas in the flooring of the dining-room wherein Gustave died, although that flooring had been washed with soap, oil, and warm water."—(*Ibid.*)

Congenital Disorder from Drunkenness.—The Paris correspondent of the *Lancet* states that "M. Demeaux, in a paper read at the Academy of Sciences, adduces a new series of cases to prove that when conception takes place during drunkenness it is a cause of epilepsy and of other

affections which take their source in the nervous centres. To the same cause he attributes a great number of monstrosities, of vicious conformations, and of congenital lesions of the nervous centres, etc., which prevented the fœtus from attaining its full development, or from living beyond a few weeks or a few months."

"*Work and Rest.*—Our evening contemporary, the *Pall Mall Gazette*, has lately discoursed at once wisely and pleasantly on a most important subject—Work and Rest. The great points urged in the article to which we allude were that the stress of our present mode of life falls on the nervous system, and that the great evil of it is rather underrest than overwork. Into any limited space it would have been difficult to put more sense and truth. There is a quality of laboriousness in all we do—in our pleasures as well as in our work. We do everything fast and fashionably. We move in ruts, and crowds, and set modes. There is no play, no leisure, no quietness in our lives. One great evil is the multiplication of engagements. There is something worrying in the very number of our undertakings. The men work longest and work best who do a few different things thoroughly—things so different and withal so interesting, that the doing of one is a complete distraction from the cares incident to the doing of the others. But the most urgent want is that of rest. The

'Sweet vicissitudes of rest and toil make easy labor.'

A capital form of rest is one that has been most foolishly abused—we mean sleep. Nearly all the men that work well and long have been good sleepers. They have a faculty of sleeping. Witness the Duke of Wellington and Lord Palmerston. But, short of sleep, we want more of quietness in social life. Our evening engagements are far too numerous, and our parties are too much of the nature of public meetings. They have lost all domesticity and simplicity, to say nothing of the cost of them, which is itself a care. They are so late as to extend far into the night.

"The injurious results of scanty rest are very obvious. They take two apparently opposite, but really related, forms—excitability and exhaustion. We are fearful and fatigued; hypersensitive and subject to ennui. We are exquisitely sensitive to pain and discomfort on the one hand, and uncommonly hard to please on the other.

"Neither moralists nor physicians have much control over the faults of our social life. We can only point them out. The remedy of them rests with the public. Will a few influential people who want easily to do an enormous amount of good, dare to initiate a few changes in our social arrangements in the direction of sleep and simplicity?"—(*Lancet.*)

"*Neuralgia; Cases treated successfully by the Spine-Bag.* By JOHN CHAPMAN, M.D., M.R.C.P., M.S.C.S., Physician to the Farringdon Dispensary.—The cure of neuralgia, whether the disease be treated by drugs given internally, or by applications of various kinds at the seat of pain, or by the two methods conjointly, is confessedly almost always difficult, and in a large proportion of cases impossible. The cases reported below have been treated by a method altogether new. By stating each case with extreme brevity, I am enabled to present at one view within a small compass the results of several experiments; and I do this in the

hope that they may produce such an impression on the minds of professional readers as may impel them to acquaint themselves with the pathological and therapeutical principles of which these results are an expression. I shall hereafter publish an exposition of these principles, illustrated by reports of cases *in extenso*, and shall then give a full description of the treatment adopted.

"1. *Facial Neuralgia.*—T. H., a gentleman, aged 35, who had been suffering during the previous fortnight, requested my advice March 18th, 1865. He was in great pain, which had been continuous from the previous day, and which had wholly deprived him of sleep. The pain was chiefly on the right side of the face and head; but during the morning preceding my visit the left side had become invaded. The affected parts were very tender, and somewhat swollen. The head was rather hot, the face flushed, the tongue thinly coated with whitish fur; pulse 92, full and strong. Several medicines prescribed by two physicians in succession had proved of no avail.

"I applied a ten-inch spinal water-bag, containing water at 130° F., to the cervico-dorsal region, and shortly afterward left the patient's room. Within half an hour I returned, when I found him asleep. The treatment was continued for two days by means of heat; afterward I used ice (at first in the lumbar region), and from the time he first fell asleep he continued free of pain, which has not since returned.

"2. *Facial Neuralgia.*—Fräulein S., aged about 25, consulted me February 3d, 1867, on account of neuralgia affecting the infra-orbital and dental branches of the trifacial nerve. The pain was not confined to one side of the face, but was sometimes most acute on one side, sometimes on the other; it increased at night, and kept her awake the greater part of each night. She had been suffering in this way for about three weeks before I saw her. Her general health was good. The affected parts presented no trace of hyperæmia.

"She was treated by means of ice, and experienced almost immediate relief. After three days of treatment she felt and slept very much better; and before the end of the fifth day the pain had wholly ceased. Nearly a year afterward she told me that it had never returned.

"3 *Facial Neuralgia.*—Mademoiselle M., aged 20, consulted me in August, 1867, when she was suffering from acute facial neuralgia, the chief foci of which were the infra-orbital foramen, and the mental foramen of the right side. The extreme pain came on in fits, sometimes at 8 A.M., sometimes at 2 P.M., but between the paroxysms the face continued to ache, and at times the patient had pain at the back of the head. She had suffered in this way about a fortnight before coming to me, and had had several similar attacks during the preceding year.

"The treatment consisted in the application of the double columned hot water-bag. The malady was immediately subdued: no distinct paroxysm occurred after the first application of heat; all pain rapidly and completely subsided, and since that date has not returned.

"4. *Dental Neuralgia.*—A. W. B., a Russian gentleman, suffering from dental neuralgia, consulted me in September, 1867. The malady was chiefly confined to the teeth of both upper and lower jaw, but no particular tooth or teeth seemed to be especially affected. The pain was intermittent, and so severe as to interfere seriously with the patient's daily occupation. No cause of the disorder, which had continued some weeks, could be discovered, and the face, so far from showing any sign of hyperæmia over the seat of pain, seemed cooler than normal. In the

course of the first day of treatmeat by means of the spinal ice-bag, the pain was completely subdued; the cold was persisted in for some time, and during the remainder of the patient's stay in England he continued free from suffering.

"5. *Dental Neuralgia.*—H. E., female, aged 21, suffering from violent and continuous pain, spreading over the teeth and gums of both the upper and lower jaw, consulted me, January 17th, 1868. The pain was most intense in the lower jaw and on the left side; she had intense headache also. The forehead and cheeks were notably hotter than normal, and she complained of great heat in the roof of the mouth as well as in the gums—which were swollen and sore. During the previous week she had had several teeth stopped with gold: one of them became most especially painful; and there was threatening of an abscess at its root.

"The treatment consisted in the application of cold across the occiput, and of heat over the cilio-spinal region—in the first instance separately, and afterward simultaneously. The pain was speedily and completely annulled; it recurred, and was again annulled by the same method on several occasions. The patient volunteered the statement that, during the application of the heat, her mouth became perceptibly cooler.

"6. *Facial and Brachial Neuralgia.*—Mary A. T., aged 44, first consulted me at the Farringdon Dispensary, December 28th, 1867, when she was suffering from neuralgia of the right side of the head, face, and neck, and along the right shoulder and arm—extending to the fingers. The right half of the tongue was also affected. The pain, which was exactly limited to the median line, was described by the patient—'like as if something is pulling the flesh off the bone, it's so dreadful, and sometimes as if the parts were screwed up in a vice.'

"She was treated by means of ice applied along the whole spine. She improved immediately and rapidly, and as early as January 15th, informed me that she had not had 'a bit of neuraliga' during the whole of the preceding week. Up to this date (February 29th), the pains have not returned."—(*Dublin Medical Press and Circular.*)

"*Amaurosis of the Right Eye relieved by the Removal of the Filling from a Carious Tooth of the corresponding side, and its Final Cure by the Extraction of the Tooth.* By M. F. De Witt, M.D., of Whitehall, Illinois.—Mr. J. P., a merchant, aged thirty-one, of good constitution, and health always excellent, in the month of June, 1856, while in the act of firing his gun, first discovered that he was blind in the right eye. He had no pain in the eye at the time, nor subsequently, neither were there any spectral illusions. Vision was lost without his being able to ascribe it to any cause. In this condition the eye remained for nearly twelve years; he could merely discriminate light from darkness, but nothing more. On the 24th day of December, 1867, while conversing with him, I inquired as to the condition of his eye, and at the same time endeavored to ascertain the probable cause of the malady. Directing my inquiries to the teeth, I learned that some two months before his loss of sight, he had had several teeth filled, and that not long after he had one of these teeth extracted, in consequence of its aching. The other teeth had never given him any trouble. Upon examination I found a large cavity in the first bicuspid of the right upper jaw, which had been neatly filled with some kind of white metal. There was also a fistulous opening upon the alveolus opposite that tooth, and, no doubt,

extending to its fang. He said there had been for a long time some soreness and tenderness at this point, and very frequently an abscess formed, which he opened with his knife. Presuming that the amaurosis had its origin in an irritation of the nervous trigeminus, distributed to this tooth, I advised its immediate extraction. Mr. P., being naturally very timid, objected. I then removed the filling from the tooth, in the hope of getting a counter opening, by which I hoped the fistula might possibly close, and the irritation be relieved. This result actually occurred. The fistula closed, the soreness of the alveolus subsided, and vision gradually restored. An offensive mass came out of the tooth soon after the plug was removed. About three weeks subsequent to this (Jan. 12th, 1868), when the eye had become nearly as good as its fellow, the soreness upon the gum recurred, and vision simultaneously became blurred. On the 19th day of January I extracted the tooth, when the blur immediately disappeared. At the present time, January 28th, 1868, Mr. P. can see quite as well with the right as with the other eye, except in the discrimination of very small objects. There was no foreign substance at the root of the tooth, its interior was filled with pus, and the communication between it and the cavity had become closed."—(*Amer. Journ. Med. Sciences.*)

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Regeneration of the Maxilla Inferior and Teeth.—In relation to this subject WM. OLIVER CHALK thus writes to the *Lancet:* "In your journal of the 15th ultimo I observe some remarks on the paper I read before the Odontological Society. It is stated that 'the object of the paper was to support a view previously promulgated by Mr. Chalk, but opposed by Mr. Tomes and others, that when redevelopment of the maxilla takes place, as is so frequently seen after the occurrence of necrosis, a new development of teeth is possible.' There are two assertions in this sentence requiring correction. I did not say that redevelopment of the maxilla inferior is '*frequently*' seen after the occurrence of necrosis; but I maintained that, under favorable conditions and a certain mode of treatment in the young subject, the bone could be regenerated, but failing such treatment no regeneration would occur. Again, I did not say 'that a new development of teeth' is possible; but that new teeth *could* be and *were formed* in the new jaw after the entire destruction of the bone itself and of the soft parts connected therewith.

"To occupy your space by any argument on the subject would be simply to repeat the opinion advanced in my paper. I will only add that three of my patients are living; and should any of my professional brethren feel an interest in the matter, I shall have much pleasure in affording them an opportunity of seeing the cases, as well as the preparations and casts, and thereby enable them to form their own opinion upon a matter of the highest practical importance. As regards myself, not a shadow of a doubt rests upon my mind that in the young subject, after the destruction of the maxilla inferior, either by strumous necrosis or caries, which as certainly involves the destruction of the deciduous and permanent teeth, especially in the latter disease, the bone may be regenerated, and new teeth developed.

"It is not denied that a new jaw-bone may be formed, and specimens besides my own exist to prove it. If then the *vis medicatrix naturæ* extends thus far, is there any valid reason why it should not complete the reparative process by the development of new teeth?"

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"*Fracture of the Jaw, through the Neck of the Right Condyle, from a Blow on the opposite side of the Face.*—Surgeon J. B. Cockburn, M.D., Royal Engineers, describes (*Army Medical Reports*, 1863) an example of this rare injury caused by a blow of the fist. The alveolar process was displaced to the left side, to the extent that the canine tooth of the right side corresponded with the central incisor of the right superior maxilla. This displacement was purely lateral. The lower jaw was in no way protruded or drawn backward. A very moderate amount of pressure inward, with the slightest inclination upward, restored the parts to their normal position. The least attempt to open the mouth caused much pain at a point close to the tragus of the right ear. It was easy to guess the nature of the injury, and it required little manipulation to detect a simple fracture of the condyloid process of the right side, at a point very close to the insertion of the external pterygoid muscle. In fact, from the very partial disengagement of the two fragments, the fracture was diagnosed to have occurred at the very point of insertion of this muscle. A case of simple fracture of one condyloid process, from a *contre coup*, has never yet, as far as he was aware, been recorded; and in this instance, the symptom which Professor Hamilton, of New York, points out as an important diagnostic mark between a fracture of the condyloid process and a dislocation of one condyle, was not present—namely, the inclination, in case of fracture, of the chin to the side on which the solution of continuity has taken place. The fracture was put up with a splint of gutta-percha moulded to the lower jaw, the usual chin sling bandage, and with a piece of cork between the teeth; and the results have been in every way most satisfactory."—(*Brit. Med. Journ.* and *Amer. Journ. Med. Sciences.*)

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Staphyloraphy.—"Staphyloraphy is of modern origin, having been first successfully executed in 1819 by Professor Roux, of Paris. For some very important improvements in the mode of performing this operation, claimed, singularly enough, by a distinguished foreign surgeon, the profession is indebted to the late Dr. J. Mason Warren, who published an account of the procedure in the *American Journal of the Medical Sciences* for 1843. At the time of his lamented death, hardly two months ago, he had operated nearly one hundred times for cleft palate, with a degree of success highly honorable to his dexterity and scientific knowledge. The same surgeon was the first to devise an operation for closing abnormal openings in the hard palate, by raising a flap of muco-fibrous structure on each side of the fissure, and uniting them at the centre.

"The operation for hare-lip has been much simplified, and the fact established that it may often be successfully performed within a few days after the birth of the child."—(Dr. S. D. Gross, *Med. and Surg. Rep.*)

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"*Operation on the Lower Lip.* By Dr. Cheever.—J. S., aged 27. On the morning of entrance, in a drunken brawl, had a crescent-shaped piece bitten from lower lip by a comrade. Etherized; a V-shaped incision made, and the edges brought together with sutures. An incision, a third of an inch long, was made in each corner of the mouth, and the mucous membrane brought out and secured to the skin. The wound healed rapidly, and in a few days the patient was discharged nearly well."—(*Boston Medical and Surgical Journal.*)

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"*Fatal Hæmorrhage after Extraction of a Tooth.*—Dr. Schünemann relates an interesting example of this occurrence. Its rarity may be judged of by the fact that it is the only case that has occurred among 9442 tooth extractions performed in the Brunswick Hospital during 1859–66. A molar tooth was easily removed from the jaw of a tailor, 21 years of age, on account of caries. The bleeding, without being great, persisted in spite of astringents, and it was then stated that he, as well as his father and brother, were subjects of hæmorrhagic diathesis. In the course of the night, severe bleeding came on, and he was brought to the hospital in an anæmic state, being scarcely conscious and his pulse hardly perceptible. The bleeding still continued, but was at last arrested by a conical cork plug. He was sufficiently recovered at the end of four days to leave the hospital, but having removed the plug next day, profuse bleeding came on again, and it could only be arrested after several applications of the actual cautery. His strength was reduced to the lowest ebb, but by the aid of stimuli he was rallied. At the end of three days, in spite of all warning, he again removed the plug, and the bleeding again recurred, and was arrested at the end of several hours by plugging and cautery. However, the patient's strength was too far gone to rally this time, and he died on the day week that the tooth had been extracted.* The autopsy threw no light on the cause of the bleeding."—(*Virchow's Archiv* and *Med. Times and Gaz.*)

"*Germ Theory of Suppuration.*—The reading of Mr. W. Adams' paper (which in part appears in our columns) at the Medical Society on Monday night gave rise to a discussion on the antiseptic treatment of wounds, which was interesting to both theorists and practitioners. Especially worthy of notice were the observations made by Dr. B. W. Richardson upon Pasteur's germ theory of fermentation, since they embraced a clear and comprehensive refutation of the hypothesis so pertinaciously maintained by the French chemist. There can be little doubt, as Dr. Richardson remarked, that M. Pasteur's theory has found a vast number of advocates, and it is probably equally true that it owes its success to the fact that it is associated with the 'vital' force theory. Pasteur has found that there are associated with certain fermentive processes a number of minute vegetable organisms belonging to the genera *Vibrio* and *Bacterium*, but he has utterly failed to demonstrate that the two facts—the fact of fermentation and the presence of these organisms—stand in the intimate relationship of cause and effect. Numerous experiments have demonstrated that suppuration—which may, for the sake of argument, be regarded as a fermentive process—may proceed in the entire absence of all vegetable and animal organisms, but it is impossible to show that in the absence of oxygen it could be carried on. Dr. Richardson asks, if the ordinary fermentive processes of albumen may take place in an atmosphere of chemically pure oxygen, why need we evoke the assistance of a complex hypothesis to explain a fact sufficiently intelligible on ordinary physical grounds? If we apply the germ theory to the oxidation of animal substances, how shall we deny it to mineral ones? And are we to believe that the oxidation of a substance like phosphorus is dependent on the operation of bacteria and vibriones? Such is the merely physical argument. The testimony afforded by the

* The internal use of powerful styptics and transfusion of blood would probably preserve life in such cases.—Z.

subcutaneous method is fully discussed in Mr. Adams' paper, and we need refer to it no further. There is one point, however, which is strongly corroborative of the opinions held by Mr. Adams and Dr. Richardson, and that is the happy result obtained in the treatment of wounds by a vacuum. If germs alone were necessary to promote suppuration, it is clear that the removal of air from a wound could not protect the surfaces, since a germ the thousandth part of a pin's head in size would be sufficient to effect all that Pasteur contends for. Yet in the hands of Maisonneuve and others the treatment of wounds by 'pneumatic occlusion' has recently been productive of the most favorable results. The whole subject is one of the most attractive and important in the wide range of modern pathology, and till further evidence is adduced a definite conclusion would be unwise."—(*Med. Times and Gaz.*)

Sulphocarbolates. "*A New Antiseptic Salt.*—Dr. SANSOM, in a paper read before the Medical Society of London, gave an outline of the theory of zymosis. In tracing the origin of infecting particles, we may, he said, divide them into two classes: First, those arising from the animal world, such as variola, vaccine, pyæmia; and secondly, those arising from the vegetable world, as favus, thrush, and, if we are to believe a large mass of scientific evidence, diphtheria, ague, etc. But whether animal or vegetable, it cannot be determined with accuracy whether the materies morbi is, at the period of infection, one or the other. It is best, under such circumstances, to call it 'germinal matter.' Dr. Sansom then related a series of cases which had occurred in his practice, all of which were united by close relations of time, place, and circumstances, and in one of which the 'oidium albicans' was discovered as a prime factor in the disease. The author then discussed the operation of disinfectants. He divided them into three classes: First, those which alter the chemical constitution of the materies morbi, such as chlorine and iodine; secondly, those which act partly chemically and partly vitally, such as the sulphites; and thirdly, those which act only on organized material, arresting vitality, such as carbolic acid. The treatment of zymotic disease by the internal administration of the sulphites was then considered, and forty-one cases were brought forward in which they had been employed, and in which one death only occurred. The facts seemed to be that the sulphites are the most easily absorbed of our internal antiseptics, but that carbolic acid is the most powerful. The author concluded by saying that the great desideratum was a salt which should combine the two. This desideratum Dr. Sansom had succeeded in fulfilling, and specimens of compound salts, the sulphocarbolates, were exhibited to the society."—(*Med. Times and Gaz.* and *Amer. Jour. Med. Sci.*)

"*Acute Hydrargyrismus.*—M. FERRAND relates a case recently under M. Monneret's care in La Charité. A woman, aged twenty, had, two days before her admission, passed five or six hours in a small room, the window of which was open, where her husband was engaged in evaporating mercury, by means of a portable furnace, from some earth which he had deposited in it long ago, supposing it to contain gold. The mercurial vapors by which she was surrounded caused her to cough, and took away her appetite. Not suspecting anything amiss, she slept in the same room, after quitting it for awhile, with the window closed. In the night she was seized with dyspnœa, spasmodic cough, and vomit-

ing, and all the next day had cough and anorexia. In the night, about twenty-four hours after the vaporization, abundant salivation came on, and next day she exhibited acute mercurial stomatitis, this soon being transformed into sanguinolent ulceration. But the appearance of the tongue varied so from day to day that the affection could never have been diagnosed by it alone. On the fifth or sixth day an eruption having some of the appearances of roseola appeared first on the face and neck, and then became general, putting on somewhat different appearances in different parts. The woman was obliged to remain a month in the hospital, and, before she left it, suffered from deep-seated pains of the limbs."—(*Union Med.* and *Med. Times and Gaz.*)

"*Physiological Effect caused by the Vapor of Mercury.*—We learn from Faraday that mercury is volatile at the freezing temperature in a confined atmosphere. The chemists of Holland have observed that an atmosphere becomes destructive to plants if it contains vapor of mercury. The same chemists have recognized that sulphur constitutes a sure antidote in this case. On repeating and confirming these experiments, Boussingault found that the neutralizing effects of the sulphur lay in the formation of sulphuret of mercury. The plants sensitive to mercury resist its action and continue to flourish, if their leaves have just been sprinkled with sulphur. In this case the sulphur at the end of a month takes a dull grayish appearance, due to the sulphuret produced. Sulphur is doubtless a little volatile at the ordinary temperature, and the tension of its vapor is not appreciable; but the results obtained show that the tension is not nil; and as the densities of the two vapors are nearly the same, and as the equivalent of mercury is nearly six times that of sulphur, it is evident that one volume of sulphur is enough for nearly six volumes of vapor of mercury. In an atmosphere where there is vapor of mercury, the sulphur in fragments acts like flowers of sulphur. It becomes covered with grayish spots; then after eight or ten days, the surface takes the appearance of iron; it is covered over with sulphuret of mercury, very adherent, not soiling the fingers, and not easily rubbed off. Boussingault has been able, by this means, to give a metallic look to objects cast in sulphur. Observing the vegetable cell languishing in an atmosphere containing traces of vapor of mercury, and on the other hand, seeing the sulphur in a still less quantity dissipating the unhealthfulness caused by the mercury, Boussingault asked himself whether something similar did not take place in the ethereal ocean. 'If the poisonous agent, of which the air is the vehicle, is a metal like mercury or some deleterious gases, such as the miasma which emanates from marshes, may we not regard as purifying agents, the sulphur, iodine, ozone, whose presence at times in the atmosphere cannot be questioned?'"—(*Journal de Pharm. et de Chimie* and *Amer. Jour. Sci. and Arts.*)

Rhigolene; its Explosive Properties. By John D. Jackson, M.D., of Danville, Ky.—"The statement that direct sunlight has produced an explosion of rhigolene, has, I know, deterred a large number of the profession from using what from the statement would be supposed to be a dangerous article—especially while ether, which is not deemed to have such a property, can be found to fill its place.

"To test this, in September last I exposed on a metallic roof, to the full of rays of the sun, the thermometer at 120 F., a phial containing

an ounce of rhigolene, of the brand of Theo. Metcalfe & Co., Boston. Within a minute, the cork was blown four or five feet into the air, and the rhigolene underwent violent ebullition, which, however, subsided within a few seconds. The cork was replaced, and pressed in more tightly, when some minutes elapsed before it was again expelled, and with more violence than before. This was repeated many times, the exposure to the direct rays of the sun being continued for a quarter of an hour.

"To further test its explosive properties, I filled two drachm phials, such as are found in ordinary medicine pocket cases—one with rhigolene of the brand above mentioned, and the other with Squibbs' Ether Fortior, and applied a lighted match to each. The ether burned, yielding the customary bluish flame, and went out at the end of thirty-two minutes, a little more than a fourth of the contents of the phial having been consumed. The rhigolene burned with a more brilliant light, yielding a yellowish blue flame, which expired at the end of sixty-three minutes, exhausting nearly half the contents of the phial.

"These experiments were several times repeated, and always with the same results. In our experiments the rhigolene phial, while aflame, was accidentally upset, and the contents poured out upon the table, burning with a beautiful flame, and was rapidly consumed, leaving the table (walnut) nearly unscorched.

"These observations show, I think, that the rhigolene is certainly not explosive in the sense that gunpowder and nitro-glycerin are, and that, while more volatile and inflammable than ether, the dangers to be apprehended while using it are precisely those attending the use of the latter.

"A bottle stoppered lightly with glass, exposed in a room at a temperature above 70 F., may have the stopper to dance, from the volatilization of some of the rhigolene, and so in the use of the Richardson's instrument, the cork is sometimes blown out for the same reason. The hand directly in contact with a bottle containing ether or rhigolene, produces a temperature sufficient to volatilize either—the ether (+ 96° F.) or rhigolene (+ 70° F.). For preventing this, we know of no better method than that adopted by Dr. Krackowizer—the inclosing of the bottle within a double-walled wire gauze box, the space between the inner wall and bottle being filled with wet sponge, the evaporation from which always keeps the contents of the bottle below boiling point.

"Dr. Bigelow has depressed the mercury with rhigolene to —19° and Page to —16°, while Dr. Krackowizer could never get a lower temperature than —8°. Our experience more readily corresponds with the last experimenters, being able, with Tieman's modification of Richardson's apparatus, to depress the mercury to —10°."—(*Western Journ. of Med.*)

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"*Absorption of Gases by Metals.*—Dr. Odling, at the Royal Institution, has promulgated several new observations on this very interesting subject. It turns out that platinum and iron are not the only metals which have the property at a high temperature of being permeable to hydrogen gas. Mr. Graham has shown that the power is possessed in a still greater degree by palladium. Ignited copper in the state of wire will absorb hydrogen to the amount of 30 per cent., and in the state of sponge to 60 per cent. Gold, in the form of assay cornettes, is capable of absorbing 48 per cent. of hydrogen, 29 per cent. of carbonic oxide, 16 per cent. of carbonic anhydride, and 20 per cent. of air, chiefly, however, nitrogen. Silver is characterized by its preferential absorption of

oxygen. It hence appears that a special relationship exists between particular gases and metals. The transmission of the gas through the metal is preceded by the absorption or occlusion of the gas in the substance of the metal so permeated. One of the most interesting of Professor Graham's experiments was made on sidereal iron—the iron of a meteorite. 'Some 45 grammes, or 6 cubic centimetres, of meteoric iron from the Lenarto fall were heated in vacuo for two hours and a half, and found by Mr. Graham to give off 16·5 cubic centimetres of gas, which consisted substantially, not of carbonic oxide, but of hydrogen to the extent at least of 85 5 per cent. of the entire yield of gas, the remainder being chiefly nitrogen and carbonic oxide. The inference that the meteorite, at some time or other, had been ignited in an atmosphere of which the prevailing constituent was hydrogen, is obvious; and, judging from the volume of gas yielded, the hydrogen atmosphere must have been a highly condensed one. For, even under ordinary atmospheric pressure, telluric iron is found to absorb but somewhat less than half its volume; whereas the sidereal iron furnished fully two and a half times its volume of hydrogen.' Dr. Odling mentions the fact that Father Secchi has distinguished one class of stars, typified by a Lyræ, as having a spectrum which is essentially that of hydrogen."—(*Med. Times and Gaz.* and *Med. News.*)

"*Melting Metal in a Handkerchief.* By C. J. Woodward, B. Sc.—We are all familiar with the experiment of wrapping a handkerchief tightly round the bowl of a spoon, and holding the part of the handkerchief thus stretched over a spirit lamp, as an illustration of the conducting power of the metal of the spoon for heat. A more sensational form of the same experiment is to be found in such books as 'The Young Man's Book of Amusement,' 'Endless Amusement,' etc., in which a bullet is to be melted in a handkerchief by wrapping it round the bullet, and then holding the inclosed bullet over a candle until melted. On trying this experiment I have failed, owing to the difficulty of preventing creases. The following modification of the experiment, however, is easily managed, and is very telling: Two or three pounds of fusible alloy are melted, and run into an evaporating dish; when cold, a handkerchief is stretched over the smooth convex form thus obtained, and the mass may then be melted over a Bunsen's burner in the course of a few minutes; on piercing the handkerchief the melted metal runs out, and may be received in a mould."—(*Chem. News.*)

"*India-Rubber Solution.*—According to Payen, the best solvent for india-rubber is a mixture of 6 to 8 parts of absolute alcohol, and 100 parts of sulphide of carbon. Benzol is the solvent usually employed for preparing the india-rubber solution used for mounting photographic prints. The lighter portions of a piece of bottle india-rubber should be selected, cut into fine shreds, and placed in a bottle with pure benzol. From 12 to 20 grains of rubber to the ounçe of benzol may be used. Rectified coal-tar naphtha is a good solvent, but its smell is rather offensive. Chloroform is a still better solvent, and may be used when cost is not an important object. According to the *Year Book of Photography*, it is a good plan to use a little chloroform to dissolve the rubber, and then dilute with benzol or rectified mineral naphtha. Several of the essential oils, such as the oil of spike, rosemary, or lavender, may

be used in the same way for first dissolving the rubber. The solubility of india-rubber varies greatly; but, as a rule, new and very elastic samples should be selected. Vulcanized india-rubber is inadmissible."—(*The Chemist and Druggist.*)

"*Vitrified Caoutchouc.*—Photographers will be interested in the invention of M. Marion described in the columns of the *Moniteur de la Photographie.* The new product appears to occupy a position midway between glass and paper, less fragile than the one and less opaque than the other. The use to which this transparent film of india-rubber is destined by its inventor is to receive the film of collodion bearing the photographic image. A glass negative is obtained in the usual manner, and upon the sensitized side of the plate the caoutchouc film is applied by means of a special kind of varnish. When it has become dried, the whole is plunged into a vessel of water, and in a few moments the collodion with its image leaves the glass, adhering to the new medium, which latter may be now packed away until it is required to be used to print from."—(*Sci. American.*)

"*Brittle Iron.*—Gay-Lussac has observed bars of iron which became almost as brittle as glass by remaining for a long time at a high temperature in an oven."—(*Ibid.*)

"*Zinc Cement.*—We have before mentioned Sorel's cement, which is formed by making oxide of zinc into a paste with a solution of chloride of zinc. This paste quickly sets into a hard mass, which may be applied for stopping teeth and a variety of useful purposes. Dr. Tollens gives a cheaper form of the same cement, which may be used for stopping cracks in metallic apparatus, and cementing glass, crockery-ware, and other materials. He mixes equal weights of commercial zinc white and very fine sand, and makes the mixture into a paste with a solution of chloride of zinc having the density 1·26. The mixture sets rapidly, but allows plenty of time for its application. As it resists the action of most agents, it will be very useful in the chemist's laboratory."—(*Mechanics' Magazine* and *Sci. American.*)

Aluminium Bronze.—"M. Evrard, in order to manufacture aluminium bronze, does not combine copper and aluminium directly together. He makes use of a kind of pig-iron containing aluminium. This is slowly heated to fusion, when copper is added to the melted mass. Aluminium, having more affinity for copper than for iron, abandons the latter and combines with the copper. After the entire mass has been well stirred it is allowed to cool slowly, so as to permit the aluminium bronze, which is denser than iron, to find its way to the bottom of the crucible. The same process may be employed, according to the author, to obtain a bronze of silicium. Indeed, the affinity of copper for silicium is energetic enough to induce M. Evrard to try this method for separating silicium from pig-iron, by adding a proper quantity of copper."—(*Amer. Artisan.*)

Tenacity of Wire.—"A silver wire, the thirteenth of an inch in diameter, will sustain 137 pounds. A wire of lead of the same size will sustain 28 pounds, and tin 36 pounds."—(*Ibid.*)

THE

DENTAL COSMOS.

NEW SERIES.

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ORIGINAL COMMUNICATIONS.

DENTAL PULPS.

BY W. H. ATKINSON, M.D., NEW YORK.

Read before the Brooklyn Dental Association and the Society of Dental Surgeons of New York.

To get at a clear comprehension of the meaning of the word, let us define:—Pulp, from Latin *Pulpa*. 1. Soft, jelly-like; 2. Brawn, the muscular part of meat devoid of fat, particularly of the wild boar, whence the word is derived; 3. The soft part of fruits; 4. Anything reduced to an amorphous (chaotic) mass, such as pulp of paper, etc.; 5. The jelly-like, gelatinous body out of which a tooth is developed.

At its first perceptible presence the *dental pulp* is devoid of structure or organization that can be made out by the microscope in the best hand; but by increment of substance, or growth of this amorphous or structureless body, it gradually acquires cells, tissues, nerves, and vessels. Connective cells here, as everywhere, are the basis or mechanical support, warp and woof of tissues; in this case, of nerves, arteries, and veins which supply the *pabulum* for enamel cells and dentinal cells, the anatomical bodies by whose agency the lime-salts are regularly consolidated and differentiated as the hard body called a tooth.

Dental pulps are the proper organs of development and nourishment of the teeth, and should therefore be well understood and sedulously observed. Dental pulps, like all the constituents of human bodies, are made up of elements upon whose life and well-being the existence and health of the body depends. The mode of development, nourishment, and obliteration of dental pulps clearly indicates a design and use in the system to which they belong.

A close inquiry into these points will enable us to appreciate the importance of these organs, and point out the impossibility of maintaining full health without them in the proper exercise of their functions.

These bodies are no exception to the rule that "untruth and misapprehension are the first presentments respecting bodies, processes, and doctrines."

The researches consequent upon the desire to destroy pulps, and yet conserve the teeth, have made us better acquainted with the minute anatomy and geography of dental pulps than "enthusiasm to know for the sake of knowing" could inspire. But the more we learn respecting them, the more fully do we become convinced of the folly of destructive surgery, and the wisdom of undying efforts at the conservation of every organ, body, and being.

If "oxygenation" be "organization" ("construction"), then every concession to "destruction," outside of the normal alternative destruction of the successive generations of cells which constitutes "nutrition," must appear to be "sin of deepest dye," either perpetrated in the darkness of ignorance, or in the wicked effort to attain good out of evil, to "climb up some other way," refusing to come in at the door of laborious investigation of the laws and processes concerned in formation, nutrition, and health, no less than disease and death of the organs and bodies we manipulate.

The preparation and appropriation of pabulum involves so much that seems impracticable and occult to the superficial, impatient student, that the very "muchness" (complication and volume) well-nigh deters him from settling upon a determinate purpose to persist until he conquers it, at least in part, so that he may have some intelligent understanding of the work before him.

The way to encourage the most despondent is to so simplify the statements of blood-making that no one can longer refuse adherence to and coincidence with the doctrines pronounced. Some things are too primal for clear statement in aphorism, and others are so ultimate as to belong to a like disability of short statement, but many of the relational conditions of things are capable of such statement as to throw much light upon the processes of living beings, when so connected as to form a serial order of phenomena. This serial order may be viewed to best advantage by careful consideration of the processes that constitute the nutrition of the proper tissue of dental pulps.

Taking it for granted that the process of development from the granular stage up to the point when the teeth are fully developed in length, and the pulp is confined within the limits of the dentinal walls, is understood or accepted, let us consider the importance of this body to the safety of the tooth, and through it that of the entire system.

The pulp, then, in this situation, consists of a congeries of vessels and nerves held together by connective tissue, and fed by the pabulum transmitted through the small opening or openings in the end of the root. So much for the source of the supply of pabulum. Now for the

immediate seat or site of the work of nutrition, or the act of change of pabulum into tissue. This is conceded to be within and around the cells which are the constituent elemental bodies of the tissues involved in the pulp structure. Just what this change is, is hard to state in words acceptable to the majority of inquirers. It is the "equation of fractional sun and earth-presence."

All cells are inclosed within a medium (atmosphere) capable of being converted into the proper bodies of the cells under the guidance or by the energy of typal force, or force and form. This equation is just like all our so-called equations, that is, no equation at all in the true sense of equals, for there is an ever-present, persistent remainder or fractional excess of one or the other element or class of substance by which the round of motions constituting life of the cells and the medium in which they subsist finds inception. Exact equation of these two forms of presence and power (sun-presence and earth-presence) would neutralize each other, and hence render the bodies dependent upon the conjunction, nugatory—nonentity.

Now, this ever-present want of balance constitutes the vascillating polarities among the molecules who fail to find equivalence, satisfaction, or complement, and thus the currents of the unseen forces of magnetism, electrism, and chemism find an ever-open door through which they struggle to separately enter and dominate the field. And were it not for the presence of that which we call ghost or type, these would never consent to a concurrent jurisdiction of the substance out of which individualities (cells, tissues, and organs) spring, because of this equation of centre surface and substance, the expression of which these three (electrism, chemism, and magnetism) ever are in the largest and least of bodies.

The becoming of bodies (their original formation) involves something more than the exercise of sight and sense. Mental interpretation of acts or motions of bodies are necessary to the understanding of any of the processes denominated nutrition. Bodies, to be seen, must arrest or deflect some portion of the pencil of light so as to be capable of forming their image upon the visual apparatus by which their physical proportions and properties are presented to the sentiency which pervades the juices of the organism with an especial focal point or more immediate centre in the brain and ganglionic centres.

This blending of the spiritual and the material or ghostly and bodily presence occurs in every formation and function of the separate existence called individual, be it granule, cell, tissue, organ or system. That the act taking place does not depend upon the presence of the ability to take cognizance of the movements need not be dwelt upon, for all metamorphosis must be more or less complete before the bodies undergoing such process have attained solidity and other character of consistence

to make it possible for them to form their image (shadow) upon the organism adapted to the function of taking cognizance of their separate existence.

If what has been said be in some good degree apprehended, we are ready to understand the delicacy of perception and the exquisite fineness of touch requisite to manipulate bodies such as the pulps of teeth, in any and every stage of their consolidation, from the merest mucous mass to the intense hardness of completed enamel, dentine, and cement.

That pulps are soft solids, and as such capable of the perversion of nutrition called inflammation, is quite clear. Any arrest of nutrient function of the elements composing pulps tends to obliteration by conversion into solid tissues, or by solution by excess of watery pabulum or excess of motion evolving heat, and thus fluidifying albuminoid and fibrinous mass, the latter of which is the first expression apparent to sight of the inflammatory process. If the process be arrested by starvation or other form of depletion at this stage, we shall have feeble structures of nearly the normal form and dimensions, but so soft as to require the best feeding and care to enable them to solidify to useful degree in after life.

In case aqueous solution be present beyond this first degree, a sort of hydrops of the pulp takes place which destroys the partially formed parts, and prevents the forming portions from passing regularly into hard tissues, and hence "blebs" in the enamel and dentine, resultant upon this condition of things.

A still further degree of expression of this dropsical affection of dental pulps prevents development of hard tissues altogether, or produces anomalous irregular masses of admixture of the hard constituents of teeth.

Lack of proper hygienic management of infants is the most prevalent cause of the deficiencies we have thus far considered, after that which is called "type" or "constitution." Abundance of exercise of the whole body, but especially of the jaws and tongue, with plenty of direct sunlight, pure air in motion, and proper cleanliness, will insure good teeth in almost any constitution that is respectably "viable."

If this deteriorating agency of excess of water or heat be located in the peripheral dentinal cells, we shall have "globular dentine" as the result, in its least mischievous degree of presence. But if one more degree of the malign potency be present, we shall have hydrops of the connective cells, distending them into effete blebs which freely float in the deteriorated pabulum, constituting "exudation corpuscles," "pus cells," and "fluid pus" of authors.

"Starvation" and "depletion" are here also the direct methods of restoration to health of this small territory. In the nature of the process of dentinal and enamel formation by the process of calcification of their

distinctive cells, which are the product of the dental pulp, there can be no reproduction of these structures. Just here an interesting inquiry arises respecting the reproduction of the other hard constituent of the teeth, namely, cement: 1. Is the cement the calcification of a product of the dental pulp? 2. Is it capable of reproduction?

These two queries would lead us into such multitudinous detail of research, observation, and deduction that we must dismiss them at present for lack of time and means for the enchanting pursuit. The impossibility of getting reproductions of enamel and dentine stands forth as a perpetual "caveat" against not only not destroying, but an imperative injunction to conserve by all means the pulps from which these essential tissues alone can be developed and maintained. If they did not need to be "maintained" as imperatively as to be "produced," we might be induced to consider the propriety of that which is denominated "Sin," namely, destroying with malice aforethought these indispensables to the usefulness of the teeth. But as the integrity of the tooth is compromised in every case of destruction of the pulp, we should swear ourselves anew every day upon the altar of our devotion to professional duty "never to destroy," but do all in our power to preserve and maintain in health exposed and even diseased pulps, regardless of the arrogant ignorance of patient or practitioner who demands destruction by our hands at his wicked behest. Be assured, beloved brethren, the difference of estimate of the importance of organs and parts is but one of difference of knowledge respecting their origin, nutrition, and use in the system or community of which they are a part.

Ignorance, dark and destructive as Erebus, still holds demoniac reign in the practice of the vast majority of those who take it upon themselves to deal with "dental pulps." The trump must be sounded and the severe truth told (severe only because true), at the risk of the loss of the favor and the incurring of the vituperations of all who refuse to come out of the dismal swamp in which they are floundering, in the vain hope of maintaining themselves above the suffocative malaria that so fatally dulls their perceptions that they cannot heed the angel voices that call with plaintive exhortation to "come out and be separate from this sin."

Treatment of exposed pulps.—Cauterization is only a hurried form of nutrient activity, preventing destructive tendencies in the form of profluvia, catarrh, pus, sanies, or sphacelus. The confined condition of pulps in fully developed teeth is favorable to kindly results of treatment the exact opposite of the general apprehension, which is that this confinement complicates and renders difficult the process of cure and repair. Calcification of the dentinal cells at the periphery of the pulp is the normal formation of primary and secondary dentine. Coagulation of the fluid in which the lime-salts are held in solution favors the consoli-

dation by stilling, quieting the molecular movements, and this is just what the application of caustic does in the most appropriate manner, because all the surfaces not desired to be acted upon by the caustic are protected from disturbance by the close-fitting cap of dentine over the stratum of dentinal cells at every point but that of exposure, where the dentine is removed by decay or careless excavation. Here, as elsewhere, the infraction of the law has made it painfully apparent, and happy is he who walks in the light shed upon his apprehension for the good of his patients and dependents.

Where pulps are exposed by the removal of sound dentine they should be treated, capped, and filled at once. When exposed by removal of the dentinal covering by the solution of caries, if the pulp be perfectly normal in nutrient activity, the same process commended should be pursued; but in case the vitality of the pulp be reduced by the exposure, it will be necessary to treat for a greater or less length of time before filling.

The best known method is to cauterize the point of exposure with pure creasote by keeping this in contact with the surface, freed from saliva or any moisture other than the natural juices that exude from the pulp itself, until this turns white, opaque, milky. This will occur almost on the instant. Now, with a shred of bibulous paper rumpled, soft, and of single ply or thickness, gently remove the excess of fluids, creasote or plasm nicely, allowing the air to dry the cavity well. When quite dry, proceed to prepare a mortar of oxychloride of zinc "osteoplastic;" just before it begins to thicken toward "setting," while it will "squat" as it drops into the cavity, insert a drop of pure creasote upon the point of exposure large enough to completely protect the newly formed "skin" or pellicle of thickened albuminoid substance and the open ends of the freshly cut dentinal tubes from contact with the "osteoplastic," then drop on or quickly apply this to the surface of the little pool of creasote, gently tapping it, to make it exactly take the form of the cavity, and push all the uncombined creasote, except the merest film, before the spreading mass of "oxychloride" or "osteoplastic," away from the pulp, and await the "setting," keeping as dry as possible. When perfectly hard, trim and fill the cavity permanently or temporarily, according as it is a primary or secondary exposure, or in healthy or unhealthy condition.

In cases of doubt, and in those when we know that the pulps are lowered in tone of health, the cavities may be treated exactly as directed, with the exception of using enough of the oxychloride to entirely fill the cavity; after which dismiss the case until a future time. How long this time should be, will depend upon circumstances. In healthy persons, it is indifferent whether it be for days or weeks; with the injunction to report instanter in cases of inception of pain in the tooth under treatment. Where pain recurs, remove the osteoplastic, and re-

peat the dressing with creasote on a small pellet of cotton, using a very *thick* article of "Sandarac varnish" on cotton as a temporary filling, and dismiss as before. Repeat this until the pulp will tolerate the osteoplastic cap, and then fill permanently. If pus exudes from the point of exposure, and the patient is out of health generally, it will be well to dress with creasote and varnish until the constitutional vice be overcome. After which, resort to first principles, and proceed in regular order.

All complications must thus be reduced to simplicity, and then conquered in detail. Fulfill the necessary conditions, and all is certain and easy as mathematics.

EFFECT OF ACIDS UPON THE TEETH.

A Paper read before the Brooklyn Dental Association.

BY C. E. LATIMER, D.D.S., NEW YORK.

Mr. President and Gentlemen:—Some months ago I exhibited before this Society the result of a series of experiments upon human teeth with different chemical agents, promising to give the conclusions arrived at in a paper at some future time. Having now some leisure, I propose to write briefly upon this matter, without, however, claiming to communicate anything new to the reading dentist, for the journals have contained articles upon this subject from many prominent men in the profession; among whom I might mention Dr. Westcott, of Syracuse, for instance, who published the results of a series of experiments made ten or twelve years ago. But these things need to be constantly agitated, as is proved by the position taken by one of our members, which called forth these experiments, viz., that Nasmyth's membrane so protected the crowns of teeth that only one acid would attack them, and that but feebly, while creasote readily destroyed them.

I submitted teeth, after extraction, to the action of some of the preparations of iron, most usually employed as tonics, and for other purposes, such as liquor ferri perchloridi; tinctura ferri chloridi; liquor ferri citratis.

Besides the above, I tried some half dozen preparations of iron, which are favorably known, but of which I could not learn the proportion of ingredients. All of these stained and injured the teeth, the most of them to such an extent that if kept at blood heat for twelve hours the enamel would appear like a stained lump of chalk, and the surface of it could be scratched off with the finger nail.

Citric acid or lemon juice I found very active in the destruction of the teeth, while acetic, oxalic, and tartaric acids, though acting less energetically, as surely accomplished the work. Neither a solution of chlo. of zinc of the strength employed for preparing the oxide for filling

teeth, the spts. camphor, nor the sat. solu. of bicar. soda produced any observable effects during the length of time my tests were continued. The chlo. of lime served only to bleach the teeth most beautifully.

Teeth which have been immersed in creasote for a year do not appear to be injured in texture in the least, but have assumed a slightly reddish hue, more especially observable in the deciduous teeth, owing, undoubtedly, to the fact that the tubuli are filled with the creasote.

Sulphuric acid acts quite vigorously, leaving the surfaces white and rough. Hydrochloric acid acts much more energetically than sulphuric, completely removing the enamel from sound teeth in two hours, if cold, or in one hour if kept at blood heat. Nitric acid produces the same result in twenty minutes at blood heat, sweeping off equally both animal and mineral constituents, and leaving the surfaces smooth, while all of the other agents tried left the surface rough and pitted, some leaving the organic and others the inorganic elements.

I have never employed acids for removing tartar or stains from teeth, although they are used by a great many persons, and even recommended by dentists, for the reason that no more efficient agent could be found for the immediate destruction of these organs than acids, and also from the difficulty which would exist of applying the agent only where it was needed, and only for the proper length of time. The arguments which are employed against the use of arsenic for the treatment of sensitive dentine will apply with redoubled force against the use of acids upon the teeth. Yet, while I hold to these views, and while I recall the many cases which have come under my notice of whole sets of teeth swept away to the margin of the gums by the use of dilute acid wash, still I can imagine cases in which such an agent might be employed to advantage. For instance, in cases of elderly persons, having teeth loosened by tartar or from salivation, where the force requisite to dislodge the tartar might endanger the teeth, or where such loose teeth were so thoroughly discolored as to render it impossible to make them ornamental by the usual methods of scraping and polishing, then a judicious use of an acid might possibly be admissible. If I were to use *any* chemical agent in such cases, I should much prefer nitric acid used at blood heat, which I should apply upon a small pellet of cotton held in tweezers, directly to the stains or the tartar, and neutralized at once, as soon as the desired effect was produced, by the application of a solution of soda or its equivalent alkali.

Of course the utmost precaution should be used that the acid may not touch the mucous membrane of the lips or gums, and under no circumstances should it be applied to young or poorly organized teeth, but only as a *dernier ressort* in desperate cases. Above all, no bungler or ignoramus should meddle with such a destructive agent, for he may do more harm in a day then he can remedy in a year. While practicing in the South I came across the route of an itinerant peddler of tooth-

wash, who had passed through the country about two years before, selling little bottles of diluted acid nicely flavored, and cleansing the teeth of the families where he stopped, to pay his board and lodging.

In the miner's parlance, I had "struck a lead," and I could distinctly trace the fellow by his works through three counties.

I made entire dentures for several persons who had destroyed fine sets of teeth with this "celebrated elixir," which was "warranted to make the blackest teeth as white as pearl, and preserve them for life." But, unfortunately, this class of swindlers is not confined to the South: we have all seen their traces, although with many modifications.

It should be borne in mind that an acid is not neutralized, except by the presence of an alkali, and although it may be sweetened and flavored so as to be most effectually disguised, and so that cotton steeped in it will clean the teeth very nicely, as we have often seen done upon the streets by peddlers, nevertheless it is acid, and will very soon destroy the teeth.

In some localities in the South I found a pernicious practice prevalent among the ladies, of rubbing the teeth with the pulp of lemons. Many fine sets are ruined by this custom.

It is not strictly true that *all* acids injuriously affect the teeth, for, in chemical language, "an acid is any substance capable of uniting with a salifiable base and forming salts;" but those substances usually known as acids, and all of those which give the acid test by reddening litmus, are destructive to the teeth. Indeed, this is the best test I am aware of, for in proportion to the rapidity of the change, and the degree of redness produced, is the destructive effect upon the enamel.

Of course I do not say that acids should be avoided, either as food or medicines; on the contrary, I think nature has wisely provided an abundance of acid fruits, as strawberries, cherries, etc., which first appear when the heat of early summer renders the system debilitated, and we earnestly long for just those acids which nature so bountifully supplies. Again, as medicines, the various preparations of iron and other mineral acids employed as tonics are almost indispensable in this degenerate age; but physicians are doing an immense amount of mischief by administering these remedies without giving suitable advice in regard to the care of the teeth. I have taken some pains to find out what the custom of physicians in my vicinity is in respect to the matter, and find that, as a rule, they ignore the teeth entirely.

Of course it brings money into my pocket, but I cannot receive it conscientiously without using what influence I may have to remedy the evil. Immediately after taking acid medicines, which should be through a tube, the mouth should be thoroughly rinsed with some good alkali, such as a solution of soda or lime water. Merely rinsing the mouth with water will not do; this only dilutes but does not neutralize the acid.

MICROSCOPY OF THE TEETH.

(Continued from page 195.)

BY S. P. CUTLER, M.D., A.E.G., D.D.S.,
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TRUTHS are facts, and facts are truths, and cannot be overthrown. When I commenced the publication of the microscopy of the teeth, I expected to meet with objectors, fault-finders, and criticisms. This is salutary and sometimes important.

I am compelled to notice some articles in the DENTAL COSMOS which are calculated to detract and mislead. In the December number, page 228, let us see what the writer says. In the whole article, if any person can make out his meaning in relation to nerve fibrils, it is more than I can do, as he is on both sides of the fence, following and imitating the authors he quotes in this respect. On the above page Tomes says (not quoting the exact language) that he has seen nerve fibrils in the dentinal tubuli, and gives directions how to prepare specimens to show them. Then, on same page, turns right about and deduces arguments to disprove their real existence by reference to puncturing the skin, and to lower animals. Mr. Tomes has seen the fibrils in the tubuli, but he did not have the moral courage in opposition to such authority as Kölliker, Nasmyth, and others to substantiate what he had seen. He (Tomes) traced the fibrils into the pulp membrane from the tubuli, but said he did not know what then became of them afterwards. Neither has any man, so far as has come to my knowledge, shown what arrangement of nerves existed in the pulp except myself. (See article at Cincinnati before the August Association, 1867.) So far, then, as Mr. Tomes' discoveries go, they are negatived by himself. In consequence, the absurd doctrine of nerve fluid and fluid wave sensation became the prevailing idea of the profession until my publications, which have clearly shown the microscopic anatomy or structure of the entire tooth, showing the filamental system complete. Who else has done so? No one. But to return to the article in the DENTAL COSMOS, page 231. See Tomes' views on the nervous system of lower animals. Same page, see Beale's views on tubular fibres. Same page, see what the objector's views are just under the above authors. Speaking of ossifying of tubuli in old persons, he goes on to say that the pressure would cause the most excruciating suffering, and as an illustration speaks of the fifth nerve, thereby trying to disprove the existence of nerve fibrils in the teeth. Let me here suppose that these very fibrils, being so extremely small and delicate, could be gradually absorbed by gradual pressure, just the same as anywhere else; living tissues may be caused to be absorbed by regular and constant pressure, even without pain when uniform and even, not as a stricture or cord round a large nerve, just enough to partially cut off nervous impressions.

These are two different cases. Same page, the editor says: "Facts, such as these, compel me to question the presence of nerve fibres in the dentinal tubuli, and induced me to regard, as I have formerly observed, the dentinal fibrils as a post-mortem result, following the extraction of a tooth, due to the coagulation of the liquor sanguinis in the tubes rather than a normal condition of a living organ, and thereby accounts for the painful sensations experienced by the vibratory theory." Every man has an undoubted right to his own views; *that is so.* Here is the same want of moral courage again. On page 230 (see marginal note)—after speaking of Beale as confirming the editor's views, which he would lead us to believe he was the author of: that is, the interglobular spaces—here is what he says: "With no intention to reopen a discussion on a topic *which has been thoroughly settled by specimens prepared by me* that offer the most conclusive evidence of their genuineness, and which have been examined and fully recognized, *not by persons unaccustomed to the use of the microscope* (a hint), but by several of the most eminent microscopists of our country, it may not be out of place to say that those who attribute such appearances to defective mounting, thereby, in the estimation of experienced observers, necessarily invalidate or cause to be received with many grains of allowance, statements which they may present of observations prosecuted in more minute and intricate directions." Alluding to my paper of August last, where I said that there were no such spaces to be found in sound dentine, which I again here repeat, I said the appearances that have given rise to such suppositions are delusive; they are in all cases defects in the mounting so far as my own observations are concerned. This I still assert, as I have seen nothing since to convince me to the contrary, after examining over a hundred specimens since, prepared by European and American observers from all classes of teeth. Neither have I met any one yet that has seen them. These are facts at least sufficient to sustain me in my assertions already made so far as has come under my own observations. I have not denied anything that others may have seen, or think they have seen, and the first interglobular space I see will be acknowledged to the profession. The nearest thing to it which I have observed is enlarged tubuli, no doubt from pathological conditions, probably from absorption of acids into them and there decomposing the lime to a certain extent. Now let us see who was the discoverer of interglobular spaces. Lehman's Physiological Chemistry, vol. ii. page 202, speaking of the teeth, says: "We do not observe bone corpuscles or other structures peculiar to bone in the dentine, but in their place we have the interglobular spaces of *Czermak*, which resemble the holes made by bullets." This article was published *long ago, which shows who was the author of these spaces.* Surely not the Dental Cosmos. Transverse sections through corroded tubuli might readily be mistaken for globular dentine as discovered by

the author at that day and time. Statements made by men of high scientific reputation are seldom contradicted by lesser lights, even if convinced to the contrary. I was told by a gentleman who is a competent microscopist, who has seen this same specimen which so much stress is thrown upon, and which has settled in the minds of so many men the existence of globular spaces, that he was not at all satisfied with the claimed results. He said it was a thick, dark-looking specimen, not distinct—was too thick.

The April number of the DENTAL COSMOS contains another article from the same author which demands notice from myself. Page 169–170. After showing a frog's foot under the microscope, and giving explanations in relation to the circulation through the capillaries, he says: "Under these circumstances, it is not surprising that such erroneous views as that capillaries have open mouths should be advanced even in this late day by some, and believed by others *who know nothing of the matter except by hearsay. It may be said that it is a waste of time to refute such palpable errors*, and this would be true if the members of our profession in general were as well informed as they should be in matters of science. Such unfortunately not being the case, it becomes a duty to present facts to the contrary."

Again, page 172: "We cannot examine the circulation of the blood in the pulp of a tooth, but from what we have seen of the capillary circulation in other tissues, and from mounted injected specimens of the dental pulp, we are justified in inferring that there is no such arrangement as open-mouthed vessels in the dental pulp." This is what I said last August at Cincinnati. There are capillaries that do not carry red blood, passing through the pulp membrane, stopping there with open (*not proven*) mouths, which transmit a nutritive fluid to the spaces between the membranes. I did not state this as a fact, only such might be inferred from this fact that the pia matal membrane, when dissected out, shows openings through every portion of it clear and distinct where the nerve filaments pass out. I have not yet proven that there are capillary vessels opening out in that way, nor have yet been able fully to disprove the same; still I yet believe the liquor sanguinis does pass out through these openings similar to that of the perspiration passing through the skin, through open mouths on the surface of the skin, which is clearly proven beyond any doubt. (See drawings in Peaslie's Histology, pages 479–481–487.) Page 489 says their total number is estimated at 2,381,248, and their volume 39,658 cubic inches, and length estimated by Wilson at 28 miles. Page 491 says: "Here they twist like a corkscrew, and according to the thickness of the cuticle, make from two to sixteen spiral turns, and terminate by small, round, or funnel-shaped apertures $\frac{1}{350}$ to $\frac{1}{240}$ of an inch, called sweat pores on the free surface of the cuticle." Here we have instances of millions of open mouths on

the free surface of the skin. What say the objectors to open mouths to this statement? These sweat ducts pass bodily through the skin or from the corium membrane or even lower down, or beneath it, out to the surface with open mouths. When I read the paper containing this statement, there were there and then several objectors to open mouths in soft tissues, denying their existence altogether, and reiterated by the DENTAL COSMOS as above quoted. A large amount of fluid passes the open mouths of the sweat glands, and why not a small amount pass out through the pulp membrane through the numerous openings there? I believe that the fibrils do not fill these openings tight and full; if so, the liquor sanguinis must exude through the membrane between the openings; these openings being very close together. It is in my mind beyond a doubt, a settled point, that the nutritive fluid does pass out at these openings, and when distended by inflammation, red corpuscles undoubtedly pass through also, though this last is not proven; only red corpuscles are sometimes found outside of this membrane. The red corpuscles do not leave the circulation anywhere else except where there is lesion of capillaries, thereby letting them escape into tissues or out as in case of dry cupping on the skin. In such case they escape, no doubt, through the sweat pores, they affording the easiest exit, being already open and surrounded by the capillaries of the skin everywhere. From what has been said, I feel confident that my positions are fully sustained so far as my assertions are concerned, notwithstanding objections have been taken upon some minor points.

Perfection has not been claimed by myself or my friends. If I have committed some errors, or made some mistakes, it is no more than could be expected, my researches having been made without the aid of a solitary individual. Neither have I used other men's discoveries, or plagiarized in the least.

Again, if interglobular spaces are sometimes found, would they not constitute the exception, not the rule? It is certainly strange that no cases have ever come under my own observations and many other able microscopists of my acquaintance. Here again I shall drop this subject. Now, in relation to the tubular contents. If we admit the existence of a fluid only, or liquor sanguinis, what would be left after drying? The per cent. of solid matter is so small, and the tubuli so very minute after drying, that there can be nothing of a solid nature found remaining to correspond to nerve fibril. If such fluid did exist when dried, what remained would be but a thin film adherent to the sides of tubules, and not as a separate fibre-shaped cord in the centre of the tube, as is actually the case, as already proven by the fluidists themselves. The existence of nerve fibres, I think, might be considered as fully established beyond any reasonable doubt.

(To be continued.)

MATERIA MEDICA.

BY B. T. WHITNEY, D.D.S., BUFFALO, N. Y.

THE above heading might indicate a learned paper on this subject; but that is not now my intention; neither is it my intention to criticise particularly the language or tone of the paper to which I refer below, but to raise my hand to ward off a sly thrust at this valuable branch of medical science, whether applied to general practice or to the specialty of dental surgery.

In the February number of the DENTAL COSMOS (vol. x. No. 2) is an "Essay," etc., headed *"Causes of the Decay of Teeth,"* in which, on page 67, occurs this singular passage: "Let them (referring to students), if you please, if they have time and inclination for it, study the *Materia Medica; but merely as a record of the gropings and stumblings of the scientific mind amid the ruins and rubbish of old superstitions.* Let them be taught whatever will make them better men and better dentists, but leave them to employ the time *now wasted in obtaining useless acquirements* in learning the principles of our profession—the laws of organic existence." (The italics are mine.)

Now, what is "Materia Medica" that is thus doomed to a place with the "*rubbish of old superstitions?*" What position does it hold in the sciences, or in the classifications of material substances which occupy so many and important places in the physical sciences? Webster says it is a "general name for every substance used in medicine—an auxiliary branch of the science of medicine." Hooper says, "by this term is understood a general class of substances, both natural and artificial, which are used in the cure of diseases." Our own Harris (Dental Dictionary) says, "that branch of medical science which embraces the knowledge of medicines, their action on the animal economy, and mode of administration. Also a collective term, comprising all medicines or all substances, natural or artificial, which are used in medical practice."

With due respect for the author, I must ask if it is consistent with the science and practice of dental surgery, as a branch of the healing art, that we should thus characterize so noble a work as the "*rubbish of old superstitions;*" and the classifications which have engaged the attention of many of the best scientific minds of the world, and been accomplished with so much labor so as to best meet the wants of practical men, "*merely as a record of the gropings and stumblings of the scientific mind?*"

If we no longer call ours a "profession"—if it is no longer the "art and science of dentistry," but merely a "trade"—if the dentist is only a "mechanic," and the *office* only a "shop," why then the thrust at Materia Medica may be tolerated so far as dentistry is concerned. The less the charlatan knows of science the better for his purpose. He

wants no written systems. Books are for the theorist. He works by "inspiration," by "intuition," by "special gifts;" or he may be the "seventh son of the seventh son."

Dental surgery is really but a branch of the science, and its practice but a department of the art of medicine and surgery; not merely one of manual labor. We must take the abnormal conditions of the mouth as we find them, with its varied forms of disease; we must be prepared to diagnose and to treat these diseases with all the aid of science as well as with practical judgment. Now I would ask the learned gentleman, how are we to accomplish this without Materia Medica? What new light is this that is to save us from the continual study of remedies and their application in the cure of disease? How is the student in dentistry to "*learn the principles of our profession?*" simply by "*the laws of organic existence.*"

Hygiene (to be well—health) needs no physician. Had the generations of man followed its strict principles, Æsculapius need not have begotten his daughter Hygeia, or any system of medicine.

Had our mother Eve never eaten the apple, or her descendants never artificially prepared their food, but had always taken it as an eccentric old man that I once knew said he did his potatoes, "in a state of nature," when he wanted them boiled with the skins on, and consequently was served by the landlady with a panful, unwashed, from the field, we might be in a better state of preservation, and need less of Materia Medica.

LEGISLATION ON DENTISTRY.

BY B. T. WHITNEY, D.D.S., BUFFALO, N. Y.

The legislature of New York has recently passed a law regulating the practice of dentistry in this State. It provides for the formation of eight District Societies, and a State Dental Society, similar to those of the medical profession. It prescribes a term of study of four years, or with lectures in a dental college of three years. The societies have the appointment of censors for the examination of students, and the power to grant licenses, and legally deal with unworthy members. This law gives us a foothold—a rock to stand upon; but is somewhat prospective in all its operations. Further legislation may be necessary to get a perfect law. The State is divided into eight judicial districts for the local societies, which are to organize on the first Tuesday in June, and elect delegates to organize a State Society on the last Tuesday in June at Albany. More of this at another time. The act as passed is as follows:

An Act to incorporate Dental Societies for the purpose of improving and regulating the practice of Dentistry in this State.

The People of the State of New York, represented in Senate and Assembly, do enact as follows:

Section 1. It shall be lawful for the dentists in the several judicial districts of the supreme court of this State, to meet together at the following named places, to wit: In district one, at the Cooper Institute, in the City of New York; district two, at the City Hall, in the City of Brooklyn; district three, at the Delevan House, in the City of Albany; district four, at the Clarendon Hotel, Saratoga Springs; district five, at Stanwix Hall Hotel, in the village of Rome; district six, at the Lewis House, in the village of Binghamton; district seven, at the Canandaigua Hotel, in the village of Canandaigua; district eight, at Medical Hall, in the City of Buffalo, on the first Tuesday of June, eighteen hundred and sixty-eight, at two o'clock in the afternoon of that day; and such dentists so convened as aforesaid, or any part of them, not less than fifteen in number, shall proceed to the choice of a president, vice-president, secretary, and treasurer, who shall hold their offices for one year, and until others shall be chosen in their places; and whenever said societies shall be organized as aforesaid, they are hereby constituted bodies corporate, in fact and under the names of "The District Dental Society" of the respective judicial districts where they shall be located: provided always, that if the dentists residing in any district shall not meet and organize themselves as aforesaid, it shall be lawful for them, at the call of fifteen dentists residing in any such district, to meet at such other time and place as they shall designate; and their proceedings shall be as valid as if such meeting had been at the time before specified.

§ 2. Each of said district societies, when organized as aforesaid, shall elect eight delegates, who shall meet at the capitol, in the City of Albany, on the last Tuesday of June, eighteen hundred and sixty-eight, and proceed to organize a State dental society, which shall be named "The Dental Society of the State of New York," and, being met, not less than thirty-three in number, shall proceed to elect, and shall thereafter annually elect a president, vice-president, secretary and treasurer, who shall hold their offices for one year, and until others shall be chosen in their places; and said society shall be a body corporate, under the name and style as aforesaid.

§ 3. The secretaries of each of the district societies shall lodge, in the county clerk's office of some county within their district, a copy of all the proceedings and records of their organization; and it shall also be the duty of the secretary of the State Dental Society, in like manner, to lodge, in the office of the secretary of state, a copy of its records and proceedings had at the organization thereof; and the said county clerks, respectively, and the secretary of state shall file the same in their respective offices, and shall receive therefor a fee of

§ 4. At the first meeting of said State Dental Society, the same being duly organized as aforesaid, the delegation from each district society shall be divided into four classes of two delegates each, who shall serve one, two, three and four years respectively, and until others shall be elected in their places: and the said district societies, at each annual meeting thereafter, shall choose two delegates to the State society, to

serve each four years, and fill all vacancies in their respective delegations that may have occurred by death or otherwise.

§ 5. Each of the incorporated dental colleges of this State may annually elect two delegates to the State Dental Society, who shall be entitled to all the privileges, and subject to the same rules and regulations as other delegates.

§ 6. The said State Dental Society may elect permanent members of said society from among eminent dentists residing in this State, but not to exceed twenty in number, at its first meeting, nor more than five in any one year thereafter; which members so elected shall be entitled to all the privileges of delegate members, but shall receive no compensation for their attendance on meetings of the State society, except when sent as delegates by the district societies or colleges aforesaid. And the said State society may elect honorary members from any State or country; but no person shall be elected an honorary member who is eligible to regular membership, nor shall any honorary member be entitled to vote or hold any office in said society.

§ 7. The several district societies established as aforesaid, at their annual meetings, shall appoint not less than three nor more than five censors, to continue in office for one year, and until others are chosen, who shall continue a district board of censors, whose duty it shall be carefully and impartially to inquire into the qualifications of all persons who shall present themselves, within the districts where they reside, for examination, and report their opinion, in writing, to the president of said district society, who shall thereupon issue, on the recommendation of said board of censors, a certificate of qualification to such person or persons, countersigned by the secretary, and bearing the seal of the said district society.

§ 8. The State Dental Society, organized as aforesaid, at its first meeting shall appoint eight censors, one from each of the said district societies, who shall constitute a State board of censors, and at the first meeting of said board the members shall be divided into four classes, to serve one, two, three and four years respectively, and said State Dental Society shall, at each annual meeting thereafter, appoint two censors, to serve each four years and until their successors shall be chosen, and fill all vacancies that may have occurred in the board by death, or otherwise. Each district society shall be entitled to one and only one member of said board of censors. Said board of censors shall meet at least once in each year, at such time and place as they shall designate; and being thus met, they, or a majority of them, shall carefully and impartially examine all persons who are entitled to examination under the provisions of this act, and who shall present themselves for that purpose, and report their opinion in writing to the president of said State Dental Society, and on the recommendation of said board it shall be the duty of the president aforesaid to issue a diploma to such person or persons, countersigned by the secretary, and bearing the seal of said society.

§ 9. All dentists in regular practice at the time of the passage of this act, and all persons who shall have received a diploma from any dental college in this State, and all students who shall have studied and practiced dental surgery with some accredited dentist or dentists for the term of four years, shall be entitled to an examination by said board of censors. Deductions from such term of four years shall be made in either of the following cases:

1. If the student, after the age of sixteen, shall have pursued any of the studies usual in the colleges of this State, the period, not exceeding one year, during which he shall have pursued such studies shall be deducted.

2. If the student, after the age of sixteen, shall have attended a complete course of lectures of any incorporated dental or medical college in this State, or elsewhere, one year shall be deducted.

§ 10. Every person on receiving a diploma from the State Dental Society shall pay into the treasury thereof the sum of twenty dollars, and on receiving a certificate of qualification from the dental society of any district the sum of ten dollars into the treasury thereof.

§ 11. The dental societies of the respective districts, and the dental society of the State, may purchase and hold such real and personal estate as the purposes of their respective corporations may require. The district societies each not exceeding in value the sum of five thousand dollars, and the State Dental Society not exceeding twenty five thousand dollars in value.

§ 12. The respective societies herein provided for may make all needful by-laws, rules and regulations, not inconsistent with any existing law, for the management of the affairs and property of said societies respectively, and providing for the admission and expulsion of members, provided that such by-laws, rules and regulations of the respective district societies shall not be repugnant to nor inconsistent with the by-laws, rules and regulations of the State Dental Society.

§ 13. All dentists who shall have been in regular practice in this State, at the time of the passage of this act, and all persons who shall have received a certificate of qualification from any district society, shall be eligible to membership in said district societies.

§ 14. The dental society of the State of New York shall be entitled to all the privileges and immunities granted to the medical societies of this State.

§ 15. This act shall take effect immediately.

The law was signed by the Governor, April 7, 1868.

PROCEEDINGS OF DENTAL SOCIETIES.

ODONTOGRAPHIC SOCIETY OF PENNSYLVANIA.

BY THOS. C. STELLWAGEN, M.D., D.D.S.

A MEETING was held Monday, March 2d, 1868, in the Philadelphia Dental College building, the President, Wm. C. Head, D.D.S., in the chair.

A very interesting lecture was delivered by Prof. McQuillen on the capillary system, which was illustrated by the web of the foot of the frog, the tongue, the lungs, and the mesentery being placed under the microscope. (See vol. x. No. 4, p. 169, April number of the DENTAL COSMOS for 1868.)

The Society then adjourned.

A meeting of the Society was held Monday, April 6th, 1868, the Vice-President, M. Lukens Long, D.D.S., in the chair.

B. F. Arrington, M.D., D.D.S., was unanimously elected a corresponding member of the Society.

Prof. McQuillen called the attention of the Society to an article in the DENTAL COSMOS (March and April), by Prof. Rufus King Browne, "On the relations of oxygen and carbonic acid to the color of the blood," and after presenting his views on the subject, suggested that it might be brought up for discussion at some future meeting.

Dr. Harris exhibited a model of a case of irregularity of the incisor teeth, and described his mode of treatment. After an animated discussion on this subject, the Society adjourned.

The Annual Meeting of the Society was held Tuesday, May 5th, 1868, at the Philadelphia Dental College building, the Vice-President, M. Lukens Long, D.D.S., in the chair.

An unusually large number of members were in attendance, and the proceedings of the evening were characterized by more spirit than usual.

The minutes of the last annual meeting were read and adopted—also, the summary of the proceedings of the Society for the past year; after which the reports of the various officers were presented and accepted.

Prof. McQuillen directed attention to a *fossil jaw*, in an excellent state of preservation, which had been sent to him by Dr. I. W. Lyon, of New York, with the statement that it had been found in the mountains of California about thirty feet under the surface of the ground, unaccompanied by other organic remains, and desiring to know what species the animal of which it was part belonged to. In response to this, he had informed the gentleman that it was the *fossil jaw* of a young horse (the deciduous molar teeth being present), and of an extinct species originally described and named by Prof. Leidy *Equus excelsus*, and who, on seeing the jaw here exhibited, at once recognized it, and suggested that it had been found in a petroleum bed; and on applying a lighted match, the bituminous odor emanating from the specimen apparently demonstrated that such had been the case. As this was a subject to which his friend, Prof. Hayden, had paid a great deal of attention, and who, in addition, had unearthed a large number of the fossil remains of species which were not known to have had their habitat in *North America* prior to his investigations, he would call upon him for an expression of his views on this subject.

Prof. Hayden remarked that the specimen exhibited by Prof. McQuillen was of great interest to geologists. The fossil remains of this horse (*Equus excelsus*) have been found in several localities in the post pliocene deposits of California, not only in the petroleum earths,

which the specimen before us was taken, but also in the superficial gravels or drift. The animal was first described from remains found mingled with fossils, supposed to be of pliocene age, in the Valley of the Niobrara River, in Nebraska. It is quite possible that this animal extended back into the pliocene. We can thus see at once that this horse had quite a wide geographical range west of the Mississippi.

Our knowledge of the remains indicating the former existence of horses on this continent is not of modern date. A species not unfrequently found in the post-pliocene deposits along the Atlantic coast was referred to many years ago by Dekay, Harlan, and Cooper. Dr. Dekay called it *Equus major*, though he published no description of it. Some years ago Prof. Leidy named it *E. Americanus*, but that name having been anticipated a few months before by Gervais, who applied it to a South American species, Prof. L. changed it to *E. complicatus*. Mingled with the bones and teeth of the mastodon and elephant are the teeth of a horse undistinguishable from those of the domestic horse of this country, to which Prof. Leidy has given the name of *E. fraternus*. The *E. major* was about the size of the English cart horse, while the *E. fraternus* and *E. excelsus* were about as large as our common domestic animal. The teeth of the two former indicate animals much like our domestic horses in form; while those of the *E. excelsus* have their triturating surfaces more like those of the ass. While we know that these horses once roamed over our continent in great numbers, there is no reason to believe that they continued in time toward the present any farther than the mastodon or elephant.

In the great work which Prof. Leidy will soon give to the world, he has described over seventy species of mammals from the tertiary and post-tertiary deposits of this country. In it he indicates sixteen species of the horse family, varying in size from a large draught horse to one about the size of a Newfoundland dog. What may have been the external form of many of these closely allied animals whose remains have been preserved for us, it is impossible now to determine absolutely. The teeth of the *E. fraternus* cannot be distinguished from those of the domestic horse, and yet its external markings may have been quite different. Even Prof. Leidy, with all his familiarity with the bony framework of animals, acknowledges that he could not distinguish the skeleton of a Bengal tiger from that of a lion. Many other examples might be adduced, but enough has been said to show that the subject is invested with great interest to every intelligent mind.

Some time was spent in putting questions to Prof. H. with reference to the manner in which fossils are preserved in the geological formations, etc., of the distant parts of our Indian territories where he has been engaged in making his surveys.

At the close of this, the Society went into election of members, James

S. Gilliams, M.D., D.D.S., Edward L. Hewitt, D.D.S., and J. L. Eisenbrey, D.D.S., having been nominated as active members, and Lionel S. Beale, M.D., F.R.S., as an honorary member.

The election of officers for the ensuing year then being in order, resulted unanimously as follows:

President.—J. H. McQuillen, M.D., D.D.S.

Vice-President.—Wm. A. Breen, D.D.S.

2d Vice-President.—John McCalla, D.D.S.

Recording Secretary.—Thos. C. Stellwagen, M.D., D.D.S.

Corresponding Secretary.—C. A. Kingsbury, M.D., D.D.S.

Treasurer.—Wm. P. Henry, D.D.S.

Librarian.—Wm. H. Trueman, D.D.S.

Executive Committee.—C. N. Peirce, D.D.S., S. S. Nones, D.D.S., E. H. Neall, D.D.S.

On motion of Prof. Kingsbury, Drs. Long and Henry were appointed a committee to conduct the President elect to the chair, who then made the following remarks:

Gentlemen:—In entering upon the duties of the office to which you have elected me, I cannot but express the hope that this year may be characterized by a marked activity on the part of the members of the society in promoting the objects for which it was established; and with this end in view, would respectfully remind you that the field lying open to us is an illimitable one, embracing not only the practical details of our specialty, but that in addition, every department of science has elements or principles which bear directly or indirectly upon it, and every new application of these is of advantage to the profession in general. As practitioners, that which relates directly to the theory or practice of the profession of course demands prominent attention, and in addition to discussing such points, it should be our aim in the future, as in the past, to encourage even those who are not members, to bring new inventions or improvements bearing upon our specialty before this society, and, after a careful examination of them, to make a fair and candid statement of their merits or demerits.

Microscopy, which for years has occupied the close attention of some of the members, should be prosecuted with additional vigor by all. A few of the results of the investigations made by us have been presented here from time to time, and practically demonstrated in the field of the microscope, under the conviction that it is one thing to talk about having made such and such researches, and another to give tangible evidence of the same by exhibiting the results to competent and experienced observers. This evening we have had the pleasure of listening to one who for years has devoted himself most assiduously and successfully in making extended geological surveys in the far west. Coming to us fresh from nature, and describing with all the zeal of an

enthusiast the characteristic peculiarities of the remains of organisms which, in ages long passed, lived upon this continent, and then, before man made his appearance upon the earth, became extinct, you cannot but be impressed by a fact to which I have over and again directed attention, viz., that the department of science known as Paleontology is one of peculiar interest to us, as the teeth, on account of their dense and indestructible character (particularly when impregnated by the soil with fluoric acid), are frequently the only remains discoverable of extinct species, and even when found associated with other portions of an organism are the most prominent and reliable data upon which to determine the nature and habits of the animal to which they belonged. To an experienced comparative anatomist a single tooth is frequently all that is required under such circumstances. Our knowledge of the general and microscopical structure of the teeth can thus be made of service in a department of science which is still in its infancy, and the determination of such points is not of necessity mere matter of scientific curiosity, but has sometimes involved material interests of great value. The application of chemistry, of the principles of mechanics and of other departments of science to our specialty, might with propriety be dwelt upon, to show what varied fields are presented for you to reap from; but time forbids, and I therefore close these remarks by suggesting that we should encourage all reputable members of the profession located in our midst, particularly the younger ones, to unite with us in promoting these objects. There are no doubt many estimable gentlemen with whom we have no acquaintance, who, if properly approached, would be glad to aid us in this work. A society must make constant additions to its ranks, introduce new elements, with new trains of thought, and thus quicken its activity, or sooner or later it will fall into a semi-fossilized condition, if it does not, indeed, become entirely extinct.

At the close of the above remarks, a vote of thanks to the late vice-president, Dr. M. Lukens Long, for the satisfactory manner in which he had presided in the absence of the president during the last year, was carried unanimously.

The nominations for delegates to the American Dental Association were then made, and the following gentlemen were chosen to represent the society at the next meeting of the association:

Drs. M. Lukens Long, Wm. A. Breen, Wm. P. Henry, S. S. Nones, C. N. Peirce, J. S. Gilliams, Wm. H. Trueman, Thos. C. Stellwagen, and John McCalla.

On motion of Dr. Trueman, the executive committee were instructed to inform the secretary of the essayist, and the subject for discussion, in time to be entered upon the meeting notices.

The executive committee have decided upon a public lecture for the next meeting to be held at 8 P.M., Tuesday, June 2d, 1868, at the Philadelphia Dental College, No. 108 North Tenth Street.

The lecturer for the evening to be Professor F. V. Hayden. The subject, "The Extinct Mammals of the West."

Members of the dental and medical profession and all persons interested in scientific pursuits generally are cordially invited to be present.

DISCUSSIONS OF THE SOCIETY OF DENTAL SURGEONS OF THE CITY OF NEW YORK.

Report of remarks on Dr. W. H. Atkinson's paper on Inflammation, at a meeting held April 8th, 1868.

BY JOHN M. CROWELL.

Dr. Fitch remarked that he did not see that the paper touched the subject of inflammation; but it may be considered properly an introduction to it. The doctrine advanced is unique—that of the passage of the white and red corpuscles through the walls of the arterioles, venioles, and veins. The doctrine heretofore taught is that the liquor sanguinis only passed the walls of the blood-vessels and carried with it the nutritive element into the adjoining tissues. I am unable to deny the claim set forth in the paper in this respect. The arterioles is the termination of the arterial circulation, and the venioles is the commencement of the venous system of vessels; although anatomically viewed they may be considered continuous tubes.

All nutrition is extra-vascular; that which nourishes the system passes through the arterioles, and the excrementitious matter passes out through the walls of the venioles into the venous circulation, and out of the system through the emunctories.

Nutrition, strictly speaking, is composed of two acts: the appropriation of food, which goes to build up the structure by cell growth, and the disappropriation of refuse elements; having performed their function and died in the tissue. This doctrine, that all nutrition is extra-vascular, has been taught by physiologists for many years.

Inflammation, properly considered, is the arrestation of the blood globules in the capillaries; but, according to the paper read, the arrestation takes place in the tissues—which arrestation is called stasis. The sequela of this arrestation is redness, heat, swelling, and pain, which is due to congestion or the filling up of the part with the globules of the blood; therefore, inflammation consists of stasis and congestion.

The inflammatory act is disposed of in either one of two ways: the gradual taking up of the blood globules into the circulation, or the death of these bodies producing pus. The first process is called resolution; the second is called suppuration. All inflammation is the result of perverted nutrition, and is always below normal function. This doctrine I have advocated for many years. The treatment of inflammation may be considered twofold: that of promoting resolution, or that of favor-

ing suppuration. The treatment that favors the one defeats the other; resolution is promoted either by counter-irritation or anæsthetization. Suppuration is promoted by keeping the part at a high temperature and moisture, which is effected by poultices, etc. My plan in the treatment of incipient abscess is by resolution; and my preference in accomplishing this is not by counter-irritation but by anæsthetization, or the amputation of all nervous force of the part; this condition may be rendered persistent hours, or even days. This plan will not always prevent suppuration; neither will counter-irritation; but the termination of the inflammation by the use of an anæsthetic will be reached with the experience of little if any pain. The philosophy of this treatment is based upon the recognition of the principle that all functional action is under the domination of nervous force. This treatment of inflammation I have maintained and urged since my residence in New York.

In answer to a question by the chairman, Dr. Fitch said: In the treatment of incipient abscess of a tooth, first cleanse the root throughout its entire length; then puncture the end of the root with a very fine broach and draw blood; arm a broach with cotton saturated with tinc. aconite (rad.) and pump it through the root; by this means living structure is reached with the medicine and pain is soon relieved. In the use of this agent great care must be taken, for it is a very active poison; from one to two drops being a full dose.

Question by Dr. Jno. Allen. Does this general physical law hold good with the hard as well as soft tissues?

Dr. Fitch. Yes, certainly; but in a very limited sense to the teeth.

Question by the Chair. What is meant by inflamed dentine?

Dr. Fitch. Does not know anything about inflamed dentine; he knows that sensation is increased. It has been explained by physiologists in different ways; some have attempted to account for it upon the principle of hydraulic pressure; it is a condition we do not know much about.

Question by the Chair. Do you find this sensation after an exposed nerve has been extirpated?

Dr. Fitch. We have no sensation in such cases.

The Chair stated that he treated nerves by the use of aconite, and found it successful.

Dr. Jno. Allen wished to state a practical fact. The particles of food that go to make up the soft tissues are taken into the circulation; this principle holds good in the hard tissues as well but in less degree. What is the evidence derived from different nations and the different modes of living, where they take a due proportion of all the constituents contained in the grain? Good teeth prevail. A due proportion of mineral elements retained in the flour is essential to the production of good teeth. We reject these elements by our system of sieving and bolting, and consequently our teeth are degenerating, etc. etc.

HARRIS DENTAL ASSOCIATION.

BY DR. WM. NICHOLS AMER, LANCASTER, PA.

THE first annual meeting of the Harris Dental Association of Lancaster, Pa., was held on Thursday evening, May 7th, at the office of the secretary.

Reports of secretary and treasurer exhibit a prosperous condition of the association. The election of officers for the ensuing year resulted as follows:

President.—Dr. John McCalla.

Vice-President.—Dr. J. G. Moore.

Secretary.—Dr. Wm. Nichols Amer.

Treasurer.—Dr. E. K. Young.

Executive Committee.—Drs. Welchens, Webb, and Martin.

The president delivered the annual address, reviewing the transactions of the association during the past year; with some account of the early history of surgery, and the introduction, progress, and present status of dental surgery, embracing the life and services of the late Dr. Chapin A. Harris.

After some further business in relation to the anticipated reunion with the Lebanon Valley Dental Association, at Litiz Springs, on the 9th of July next, the association adjourned to meet at the call of the president.

LEBANON VALLEY DENTAL ASSOCIATION.

BY S. H. GUILFORD, D.D.S., LEBANON, PA.

A REGULAR meeting of the Lebanon Valley Dental Association was held at Pottsville, January 17th, 1868.

The annual election for officers resulted in the unanimous choice of the following:

President.—S. H. Guilford, of Lebanon.

Vice-President.—W. K. Lineaweaver, of Pottsville.

Secretary.—W. H. Scholl, of Bernville.

Treasurer.—J. W. Moffitt, of Harrisburg.

It was resolved to accept the invitation of the Harris Dental Association of Lancaster, to meet with them at Litiz, in July next.

Drs. Brown and Moffitt, each an inventor of a new method for the construction of artificial dentures, explained and set forth the claims of their respective inventions, and exhibited specimens of work.

Dr. Brown's method is protected by letters patent, and is "for the method of attaching teeth to swaged plates by means of any fusible metal or alloy." He claimed that plates made after his method were extremely thin, as light in weight as rubber; would not oxidize in the

mouth, and were very easily repaired. By his process, teeth could be attached to gold, silver, aluminium, or other swaged plate.

Dr. Moffitt's invention, known as the "adamantine base," is not patented, but free, his compensation being derived from the sale of flasks and metal. The entire plate is cast of fusible metal, and he claimed that it could be made as thin as silver, was very light in weight, inoxidizable, non-expansive or contractile, easily mended, and could be made up in much less time than rubber. Finishing and polishing is the same as for rubber-work.

In view of the above, the following resolution was unanimously adopted:

Resolved, That the Lebanon Valley Dental Association cheerfully recommends to the favorable notice of its members, and the profession generally, the trial of the inventions of Drs. Moffitt and Brown, the respective merits of which have just been so fully set forth.

Dr. Lineaweaver read a very interesting and able paper on "the treatment of exposed pulps."

The amendment to the by-laws, making the meetings of the Association semi-annual instead of quarterly, as heretofore, was adopted.

Dr. Brenizer was appointed essayist for the next meeting, to be held at Litiz, in July, and the Association adjourned.

WEST JERSEY DENTAL ASSOCIATION.

A STATED meeting of this Society was held at Trenton, May 12th, at 3 P.M.

There was a good attendance, resulting in an animated discussion of various topics pertinent to the profession and the occasion.

A committee was appointed to inquire into the feasibility of petitioning the Legislature to establish some law regulating the practice of dentistry, and report at the next meeting.

Adjourned to meet the second Monday of July next, at Mt. Holly.

J. B. WOOD, *Secretary, Camden, N. J.*

CHICAGO DENTAL SOCIETY.

AT the regular annual meeting of the Chicago Dental Society, held April 6th at S. S. White's Dental Depot, 101 and 102 Randolph Street, the officers elected for the year were as follows:

President.—Dr. M. S. Dean.

Vice-President.—Dr. W. A. Stevens.

2d Vice-President.—Dr. A. E. Brown.

Corresponding and Recording Secretary.—Dr. A. W. Freeman.

Treasurer.—Dr. Wm. Albaugh.

Librarian.—Dr. R. Gibson.

Executive Committee.—Drs. S. B. Noble, G. H. Cushing, A. E. Brown.

Drs. Albaugh, Cushing, and Young were appointed a committee for the arrangement of subjects for discussion and assignment of essays for the meetings of the year. A. W. FREEMAN, *Secretary.*

EDITORIAL.

IN another portion of the magazine is presented the continuation of an article on the "Microscopy of the Teeth;" which, on account of the statements made in it relative to the *interglobular spaces*, demands a response. Those who have paid the least attention to the subject, are well aware that I have never claimed to be the discoverer of these spaces, and that my investigations in this direction originated in the determination to ascertain whether certain objections urged against an illustration (from *Kölliker's Microscopical Anatomy*) used by me in connection with a paper on the "*Microscopy of the Dental Tissues,*"* were well grounded. Those objections, now repeated by another, were then promptly met and clearly demonstrated to have been entirely without foundation by microscopical sections prepared by me, which were examined by competent observers in Philadelphia, Boston, and New York. These *spaces* are by no means difficult to find—at least by persons accustomed to make sections of teeth—nor the specimens showing them scarce, for in addition to a number in my own possession—some of which have been recently prepared, and were shown at a meeting of the *Biological Section of the Academy of Natural Sciences of Philadelphia,* held in the early part of this month—there are several gentlemen in this city and other parts of the country and Europe who have similar specimens. Under such circumstances it is quite evident that those who deny the existence of points so easy of demonstration have much to learn, not only in the preparation and mounting of specimens, but also in the use of the microscope.

The earnest student, desirous of acquiring a knowledge of the mysteries of nature, recognizing that familiarity with the past literature and the latest additions to science are indispensable requisites to those engaging in such studies, and regarding the world as a vast university, is always ready and willing to learn from every source, from nature, from books, and by constant association with men who are of authority in their respective departments. By failing to take advantage of such opportunities indeed, one is unfitted in this day to instruct others in

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* DENTAL COSMOS, vol. vii. pages 449–505, 1865.

matters of science, which has been truly defined as "the knowledge of the many, orderly and methodically arranged and digested so as to become attainable by any one." In my own contributions, care has been invariably exercised to give due credit to others, and in the subject under consideration, the researches of Owen, Tomes, Czermak, Kölliker, and Beale have been duly acknowledged, and the paper of Czermak in particular made mention of, with a statement of where it could be found,* as reference to a back volume of this magazine will prove.† Prof. Owen, however, described these spaces (as "calcigerous cells"), twelve years before (1838) Czermak's paper appeared (1850).‡

Those who have a limited acquaintance with the literature of a subject, not unfrequently imagine themselves entitled to the credit of having made important discoveries—and are so regarded by others who know no better—when in reality the facts upon which the claim rests have been long known and unmistakably recorded in the annals of science. Again, ever and anon in the contributions to science, erroneous views make their appearance, and it is not only the right of a student, but the bounden duty of an editor to take exception to them, and point out their fallacies, that others may not be led astray.

In the articles which the writer does me the honor to quote from, not the slightest reference is made to him or his paper, and his application of the quotations to himself is entirely of his own choosing. Others, as has been shown, have denied the existence of the interglobular spaces; and there are persons who still talk and write about the obsolete idea that capillaries have open mouths. Years ago, with the view of correcting this fallacy, I directed attention to the fact, that "by the aid of the microscope it has been clearly demonstrated that nutrition is invariably *extra-vascular*. In other words, the fluid or plasmatic parts of the blood transude through the parietes of the capillaries, and is then assimilated by the tissues. Notwithstanding the fact that the capillaries are possessed of distinct membranous parietes, their permeability removes all impediment to the nutritive process."§

Those who have sat under my instructions as students during the past twelve years, will bear testimony to the fact that this point was impressed upon their minds, session after session, by every possible means of illustration; but in doing so it was taught not as a new idea, but as one fully recognized by thoroughly educated physiologists for *more than a quarter of a century*. As evidence, it is only necessary

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* Siebold und Kölliker Zeitschrift für Wissenschaftliche Zoologie, 1850.

† Dental Cosmos, vol. viii. pages 75 and 118, 1866.

‡ British Association for the Advancement of Science, vol. vii. p. 141, 1838.

§ Non-vascularity of Human Dentine. J. H. McQuillen, M.D. Dental News Letter, vol. x. p. 300, 1857.

to turn to the writings of the great German physiologist, Johannes Müller,* Carpenter,† Tomes,‡ and other physiological works in my library, to find ample confirmation of this. All of these writers speak of the matter as a well recognized fact, and Müller, in the most logical manner, directs attention to the untenable character of the position at that time maintained by Doellinger and Dutrochet, that the tissues are nourished by the direct union of the blood corpuscles with them.

BIBLIOGRAPHICAL.

A PRACTICAL TREATISE ON OPERATIVE DENTISTRY. By J. TAFT, Professor of Operative Dentistry and Dental Hygiene in the Ohio College of Dental Surgery. Second edition; with eighty-six illustrations. Philadelphia: Lindsay & Blakiston. 1868.

Nine years ago, when the above work was first offered to the profession, its various points were noticed in a review published in this magazine. On this account, and the fact of its character and contents being known to the readers of the DENTAL COSMOS, it is only necessary to state that in the edition now presented a certain portion of the work has been rewritten, and about fifty pages of new matter added, with the avowed aim on the part of the author of bringing it up to the requirements of the day, by introducing the various modifications and improvements made in operative dentistry during the intervening period. It is to be regretted that when doing this the necessity of introducing a careful description of the manner in which the examination of the teeth should be conducted, the means of diagnosing the different forms of toothache, etc., was not substituted for the *vague generalizations* presented.

Skill in diagnosis, with the dentist as with the physician and the surgeon, constitutes one of the most important elements of difference between practitioners; and although manual dexterity in the performance of operations is a matter of the highest importance, no one ever rises to a justly elevated position in the estimation of his fellow-practitioners and the community, unless manifesting judgment and skill of a marked character as a diagnostician. So important is the necessity of an accurate diagnosis regarded by medical and surgical writers, that the most minute points are described, to afford the student the fullest opportunity of appreciating the characteristic differences presented by the

* Elements of Physiology, p. 469. By J. Müller, M.D. Translated from the German by Wm. Baily, M.D. From the second London edition. By John Bell, M.D. Philada.: Lea & Blanchard, 1843.

† Elements of Physiology, p. 842. By W. B. Carpenter, M.D., F.R.S. Philada.: Lea & Blanchard, 1846.

‡ Dental Physiology and Surgery, p. 62. John Tomes. London, 18[illegible]

varied affections which flesh is heir to; and there is no reason why the same care should not be exercised in the preparation of dental works. Attention was directed to this matter in the former review, and a brief and therefore necessarily imperfect sketch presented of the manner in which examinations should be conducted. In conclusion, it is difficult to understand why orthodontia, or the correction of irregularities of the teeth, should not have found a place in a work on operative dentistry, for it certainly belongs to that department, and there is a demand for a treatise in this direction which shall meet the exigencies of everyday practice more fully than anything which has yet been presented. Directing attention to these points, with the hope that the author may be induced to recognize their importance when preparing another edition of the work, this one is commended to the practitioner and student as presenting a fair resumé, so far as it goes, of the general practice of the profession in this country at the present day, and therefore calculated to prove of service to them. J. H. McQ.

OBITUARY.

DIED, of hæmoptysis, on the 16th of March, 1868, at the residence of Dr. W. H. Morgan, in Nashville, Tenn., DR. JOHN P. WILSON, in the 28th year of his age.

Dr. Wilson was a native of Pennsylvania, but for more than two years preceding his death had resided in Nashville, and was a worthy member of the Nashville and the Tennessee Dental Associations. He was an ornament to the profession, and was no less distinguished for suavity of manners and uniform gentlemanly deportment than as a skillful practitioner of dental surgery.

CORRESPONDENCE.

ST. LOUIS DENTAL COLLEGE.

EDITORS DENTAL COSMOS:—At the last meeting of the American Dental Association, the dental profession officially disowned the Saint Louis Dental College (not the *Missouri* Dental College). From a journal put forth by said defunct college, I see they advertise a full corps of professors, and still offer to sell diplomas to any dentist for twenty-five dollars. If this institution stood on its own bottom, I would say let it go; it can do no harm; but it has advertised among its faculty names eminent as medical men, whose influence is falsely used by this humbug institution, and with their names they are doing mischief, misleading the minds of many of our profession into the idea that this is a

real dental college, with a full corps of professors, when it is really a humbug, and never had a course of lectures delivered.

Now, I write this mainly for the purpose of calling out those medical gentlemen who allow their names to be used as members of said college. It is time that such nefarious schemes should be fairly set before the dental profession at least, and as far as possible before the world. That this may be done, I ask your space for this communication.

WM. O. KULP, D.D.S., *Muscatine, Iowa.*

SELECTIONS.

THE RUBBER SUITS.

We give below some extracts from the Briefs of the argument of Defendants' counsel, Col. S. S. Fisher, in the cases of the Dental Vulcanite Co. against Dr. A. Berry, of Cincinnati, and E. Honsinger, of Chicago, in the Circuit Court, argued in February last, which will give a very clear idea of the points made, and the line of argument, at least so far as it pertains to the patents under which the Dental Vulcanite Co. are operating.

The remaining part of the argument presents very forcibly the fact that the defendants are now, and have been for some time using a compound different in character from that prepared under the Goodyear patent, and for which a patent has been granted to E. L. Simpson, of Bridgeport, Conn.

No decision has yet been rendered in these cases.—*Dental Register.*

Circuit Court of the United States, Southern District of Ohio. Henry B. Goodyear vs. *Archibald Berry. Brief for Defendant.*

I. *The two reissued patents upon which this suit is brought are void, because they are not for the same invention as the original.*

The original patent describes a compound of India rubber with sulphur and certain other substances named, which compound is subjected to a high degree of heat, in accordance with the process of Charles Goodyear. No other gum than India rubber is mentioned in the specification or claim, nor is there any hint that the process can be applied to any other gum, or that any other gum is vulcanizable. The entire specification is found on p. 327 of defendants' New York testimony. The claims are as follows:

"What I do claim as my invention, and desire to secure by letters patent, is the combining of India rubber and sulphur, either with or without shellac, for making a hard and inflexible substance, hitherto unknown, substantially as herein set forth.

"And I also claim 'the combining of India rubber, sulphur, and magnesia or lime, or a carbonate or a sulphate of magnesia or of lime, either with or without shellac, for making a hard and inflexible substance, hitherto unknown, substantially as herein set forth.'"

The reissued patents interpolate the words "other vulcanizable gums" and "other allied gums" after every mention of India rubber or caoutchouc. The claims of the reissues are as follows:

"Reissue No. 556.

"But what I do claim as the invention of the said Nelson Goodyear, and desire to secure by letters patent, is the combining of sulphur and India rubber, *or other vulcanizable gum*, in proportion substantially as specified, when the same is subjected to a high degree of heat, substantially as specified, according to the vulcanizing process of Charles Goodyear, for the purpose of producing a substance or manufacture possessing the properties or qualities substantially such as described; and this I claim whether the said compound of sulphur and gum be, or be not, mixed with other ingredients, as set forth.

"Reissue No. 557.

"What is claimed as the invention of the said Nelson Goodyear, deceased, and desired to be secured by letters patent, is the new manufacture or substance herein above described, and possessing the substantial properties herein described, and composed of India rubber, *or other vulcanizable gum*, and sulphur, in the proportions substantially such as described, and when incorporated, subjected to a high degree of heat, as set forth; and this I claim whether other ingredients be or be not used in the preparation of said manufacture, as herein described."

Interpolations into the specification and claim, of matters not found in the original specification or drawings, avoid the patent.

Carhart v. *Austin*, 2 Fisher, 543.
Sickles v. *Evans*, 2 Fisher, 437.

Although the Patent Office at one time seemed to suppose that proof outside of the record might be received to show what the patentee's invention was, yet this was so obviously improper that the present rule expressly forbids it. Rule 52, Edit. 1867, provides as follows:

"52. The general rule is, that whatever is really embraced in the original invention, and so described or shown that it might have been embraced in the original patent, may be the subject of a reissue, *but an applicant will not be allowed the benefit of proof that there was more in his invention than is shown in his original application, model or specimens.*"

The claim for "other vulcanizable gum" is not only broader than the original invention, but if it had been appended to the original patent that patent would have been void, because an inventor has no right to claim a process as applied to "all other vulcanizable gums." He has not discovered that all other gums can be subjected to his process. He does not name any such gums, nor describe how his process is to be applied to them. He claims the unknown and the undiscovered, as well as the known, that he has no right to throw the pall of his monopoly over the future discoveries and inventions of other men.

O'Reilly v. *Morse*, 15 How. 112–119.
Leroy v. *Tatham*, 14 How. 175.
Sickles v. *Gloucester Co.*, 1 Fisher, 238.
Sickles v. *Evans*, 2 Fisher, 435–438.
Burr v. *Duryee*, 1 Wall, 576, 577.

In *O'Reilly* v. *Morse*, p. 113, the Supreme Court says:

"Nor is this all. While he shuts the door against inventions of other persons, the patentee would be able to avail himself of new discoveries in the properties and powers of electro-magnetism, which scientific men might bring to light. For he says he does not confine his claim to the machinery or parts of machinery which he specifies; but claims for himself a monopoly in its use, however developed, for the purpose of printing at a distance. New discoveries in physical science may enable him to combine it with new agents and new elements, and by that means attain the object in a manner superior to the present process, and altogether different from it. And if he can secure the exclusive use by his present patent, he may vary it with every new discovery and development of the science, and need place no description of the new manner, process, or machinery upon the records of the Patent Office. And when his patent expires the public must apply to him to learn what it is. In fine, he claims an exclusive right to use a manner and process which he has not described, and, indeed, had not invented, and, therefore, could not describe when he obtained his patent.

"The Court is of opinion that the claim is too broad, and not warranted by law.

"No one, we suppose, will maintain that Fulton could have taken out a patent for his invention of propelling vessels by steam, describing the process and machinery he used, and claimed under it the exclusive right to use the motive power of steam, however developed, for the purpose of propelling vessels. It can hardly be supposed that under such a patent he could have prevented the use of the improved machinery which science has since introduced; although the motive power is steam, and the result is the propulsion of vessels.

"Neither could the man who first discovered that steam might, by a proper arrangement of machinery, be used as a motive power to grind corn or spin cotton, claim the right to the exclusive use of steam as a motive power for the purpose of producing such effects."

But this very question has been decided in a case precisely similar to this. Charles Goodyear, in his patent of 1849, described a compound of rubber and sulphur. He named no other gum. In his reissue No. 1085, dated Nov. 25, 1860, he interpolated the words "other vulcanizable gums." To show the similarity of these patents, I give the originals of Nelson and Charles Goodyear and the reissues of each:

Charles Goodyear's Patent, December 25, 1849.

"What I claim as my invention, and desire to secure by letters patent, is the curing caoutchouc or India rubber by subjecting it to the action of a high degree of artificial heat, substantially as herein described, and for the purpose specified.

"And I also claim the preparing and curing the compound of India rubber, sulphur and carbonate, or other salt or oxide of lead, by subjecting the same to the action of artificial heat, substantially as herein described."

Nelson Goodyear's Patent, May 18, 1851.

"What I do claim as my invention, and desire to secure by letters patent, is the combining of India rubber and sulphur, either with or without shellacs, for making a hard and inflexible substance hitherto unknown, substantially as herein set forth.

"And I also claim the combining of India rubber, sulphur, and magnesia, or lime, or a carbonate or a sulphate of magnesia, or of lime, either with or without shellac, for making a hard and inflexible substance hitherto unknown, substantially as herein set forth."

Charles Goodyear's Reissue, November 25, 1860.

"What is claimed as the invention of Charles Goodyear, deceased, is subjecting caoutchouc, or India rubber, *or other vulcanizable gums*, mixed with or in the presence of sulphur (whether with or without other ingredients), to the action of heat, for the purpose of affecting its qualities or properties, as described."

Nelson Goodyear's Reissue, May 18, 1858.

"But what I do claim as the invention of the said Nelson Goodyear, and desire to secure by letters patent, is the combining of sulphur and India rubber, *or other vulcanizable gum*, in proportion substantially as specified, when the same is subjected to a high degree of heat, substantially as specified according to the vulcanizing process of Charles Goodyear, for the purpose of producing a substance or manufacture possessing the properties or qualities substantially such as described; and this I claim whether the said compound of sulphur and gum be or be not mixed with other ingredients, as set forth."

It is no answer to this objection to say that the mention of all other vulcanizable gums is merely a new *subject*, or use, to which the invention is to be applied. It is not a new *use*, but a new *means*.

The invention of Goodyear, reduced to its simplest form, is a compound process, consisting of three steps or elements:—1. Sulphur; 2. Rubber; 3. Heat.

No one or two of these is the invention. The union of them all is means by which the patentee obtains the result.

Now, in the reissue, he proposes to strike out the second member, to wit, rubber, and insert "all other vulcanizable gums." This is a change in the *means*, in the combination, in the very invention itself. It is not a new result of the invention—the result is the same, to wit, a hard product. It is a new way of producing that result, and one not described or hinted at in the original specification, nor, so far as we have any proof, is it the invention of Nelson Goodyear.

This reissued patent of Charles Goodyear coming before Mr. Justice Clifford, in the case of *Goodyear* v. *The Providence Rubber Co.*, a case fiercely contested and ably tried, the learned judge says:

"But another objection is taken to this claim of a very different character. Express terms of the claim make it include not only India rubber, when compounded with sulphur and subjected to a high degree of artificial heat, but *all other vulcanizable gums*, whether with or with-

out other ingredients. Nothing of the kind is described in any one of the patents granted to the original inventor, not even in the patent to which the claim is annexed.

"Under the circumstances, I am of opinion that the claim of this patent is broader than the invention of the original patentee, and, consequently, that it is void, because it is not for the same invention as the patent which was surrendered as the foundation of the reissue. *O'Reilly* v. *Morse*, 15 How. 112; *Batten* v. *Taggart*, 17 How. 83; *Burr* v. *Duryee*, 1 Wall. (S. C.) p. 531; *Leroy* v. *Tatham*, 14 How. 175."

See *Goodyear* v. *Providence Rubber Co.*, 2 Fisher, 499.

This authority is decisive of this point, so far as authority can be of any value, and it must be overruled or followed. It is so obviously in accordance with the later deliverances of the supreme and circuit courts upon this vexed question of reissues, that I apprehend that it will recommend itself to the careful consideration of the Court in the present case.

This point is raised under the following paragraph of the answer:

"This defendant, further answering, on information and belief, says that said original patent was surrendered, and said reissues obtained, for the purpose of including and embracing in said reissued patents, matters, and things, and inventions not included and embraced and described in said original patent, and that said reissues do include and embrace matters and things, and inventions not included and described and contained in said original patent, and of which the said Nelson Goodyear was not the first and original inventor, and are therefore void."

It was not made, argued, or passed upon by Judge Nelson in either of the cases tried before him.

See *Goodyear* v. *New York Gutta Percha Co.*, 2 Fisher, 312; *Goodyear* v. *Wait*, pamphlet.

The effect of a decision upon this point adverse to the patentee, would at most compel him to reissue again and be more modest in his claims. To sustain such claims in the face of such objection would be to throw open the door for interpolation *ad libitum.*

II. *The reissues were improperly granted.*

One for a process producing inevitably a certain product, and the other for the same product as produced by the process. Such patents could not be granted to separate individuals. How can they be separately granted to the same individual? If he could receive them, he could dispose of them separately. Would not that be a double sale of the same invention? A new way of making an old thing is doubtless patentable, but not the means, and then the old thing *as made by the new way.*

III. *Infringement is not proved.*

"The burden of the proof on the issue of infringement is upon the plaintiffs. They charge infringement, which is a wrongful act in the

nature of a trespass, and inasmuch as no one is presumed to do wrong, the rule is that he who alleges that another has committed a wrongful act must prove it."

Clifford, J., *Union Sugar Ref.* v. *Matthiessen*, 2 Fisher.

The defendants are not infringers, because they *buy* the soft rubber compound, and the proof of the complainants, with a single exception, is confined to such purchases. The thing purchased was soft rubber, called by certain names. The vendors did not know its composition, and it is not traced to any one who does. General proof that rubber of certain names was made in a certain way does not prove that the rubber bought by the defendants, though called by such names, was made in the same way.

In Chicago the only proof offered is that of the defendants themselves, who append certain pieces of soft rubber, the composition of which they say is unknown to them, and the commercial names of which they do not give. The composition of this rubber might have been proved by analysis, and it might have been traced to the vendors. It was the duty of complainants to do this, or at all events to prove that this rubber was their rubber. They do not attempt this. All that they do is to attempt to prove a negative, and to ask the Court to find its matter of fact, without evidence either that the rubber exhibited by the defendants contains sulphur in certain proportions, or that the defendants must infringe, because the complainants are entitled to all rubber that will vulcanize, no matter what may be its ingredients or their proportions.

The bill having called for an answer under oath, the defendants have answered under oath, denying infringement. The answer can only be overcome by testimony equivalent to the evidence of two witnesses. 3 Green. Ev. 250.

(After a critical examination of the ingredients and proportions of the Simpson rubber, the argument proceeds as follows.—Ed.)

"But where does Goodyear get the right to claim four ounces of sulphur to the pound of rubber? *Charles* Goodyear, whose patent is now public property, described his compound as consisting of five parts sulphur to twenty-five parts of rubber; five to twenty-five is one-fifth sulphur, which in one pound would be 3⅕ ounces. Nelson Goodyear, in his original patent, says:

"The indispensable ingredients used in my composition are caoutchouc and sulphur; *and when only these two ingredients are used*, the best proportion will be about *equal parts, by weight, of each of them; indeed a much less proportion of sulphur will not suffice*. But though the combination of so large a proportion of sulphur with the caoutchouc will produce, when cured, a hard substance, a still better result will be obtained by the introduction of magnesia, lime, carbonate of magnesia or lime, or sulphate of magnesia or lime, into the composition, in which case the following proportion will be found a highly advantageous one, viz.: One pound of caoutchouc, half a pound of sulphur, and half a pound of magnesia or lime, or carbonate of magnesia or lime, or sul-

phate of magnesia or lime. The proportions specified in both of these compounds may be considerably varied without materially changing the result; but in no case will a much less quantity of sulphur than four ounces to every pound of caoutchouc be sufficient, in which respect particularly my compounds differ very essentially from every other composition of India rubber in use."

Now, beyond all question, the obvious meaning of this is, that when you use rubber and sulphur only, you must use them in equal parts, *i.e.* 16 oz. of sulphur to 16 oz. of rubber, and a much less proportion would not suffice.

But this proportion may be modified by introducing other ingredients named, so that less sulphur may be used, but in *no* case (not in *either* case), that is, not even by the use of lime and magnesia, can less than four ounces of sulphur be used.

Therefore, when Goodyear claims as low as four ounces, or much less than sixteen ounces of sulphur, he claims it only in combination with other ingredients, and as to them he can claim only those named in his specification, or their chemical equivalents. Neither the complainants, nor their learned chemists, have yet been sufficiently daring to claim that linseed oil and gum benzoin are the equivalents of carbonate of lime or sulphate of magnesia.

The reissues state this matter of proportion very ambiguously, and with intention to deceive; but they do not contradict or correct the specification of the original, and must be construed in the light of the positive statement in the original patent. Compared with the original patent, the Simpson rubber does not, in any form or proportion named in his patent, even as construed or analyzed by complainant's witnesses, infringe the Nelson Goodyear patent, and if the reissues are broader than the original in this respect, they are void.

IV. *The open and notorious purchase and use of soft rubber by the Dentists of this vicinity, for the purpose of making vulcanized plates, is a bar to a proceeding in equity for an injunction. The only remedy of complainants, if they have any, is at law.*

But one suit was ever brought here, to wit, the one against Toland, and that was not litigated. There is no proof that any one was licensed, except Taft and the Ohio Dental College, to both of whom licenses were presented. It is claimed that others are named in the "Vulcanite," but the total does not exceed a half a dozen, and it will hardly be claimed that lists in the publication of complainants are proof of licenses. But both the suit and the licenses are over five years ago. If they show anything, they show the fact that the use of the rubber plates in this vicinity was known to the complainants, and yet for five years not one step has been taken to vindicate what they are now pleased to call their rights. The label was a mere sham, and the testimony shows that it was never regarded.

Judge Story says, in *Wyeth* v. *Stone*, 1 Story, 282:

"I agree that it is quite competent for a patentee at any time, by overt acts or by express dedication, to abandon or surrender to the public, for their use, all the rights secured by his patent, if such is his pleasure, clearly and deliberately expressed. So if, for a series of years, the patentee acquiesces without objection to the known public use by others of his invention, or stands by and encourages such use, such conduct will afford a very strong presumption of such an actual abandonment or surrender. *A fortiori*, the doctrine will apply to a case where the patentee has openly encouraged or silently acquiesced in such use by the very defendants whom he afterward seeks to prohibit by injunction from any further use; for, in this way, he may not only mislead them into expenses or acts or contracts against which they might otherwise have guarded themselves, but his conduct operates as a surprise, if not as a fraud upon them. At all events, if such a defense were not a complete defense at law, in a suit for any infringement of the patent, it would certainly furnish a clear and satisfactory ground why a court of equity should not interfere, either to grant an injunction, or to protect the patentee, or to give any other relief. This doctrine is fully recognized in *Rundell* v. *Murray*, Jacobs' R. 311, 316, and *Saunders* v. *Smith*, 3 Milne & Craig, 711, 728, 730, 735. But if there were no authority on the point, I should not have the slightest difficulty in asserting the doctrine as found in the very nature and character of the jurisdiction exercised by courts of equity on this and other analogous subjects."

Judge Drummond says, in *Goodyear* v. *Honsinger*, Mss.:

"I adverted, during the argument, to an inference which might be drawn from the conduct of a patentee—from the conduct of the representatives of the patentee in this case—selling licenses to some parties, and allowing other parties to go on and use the very thing which was licensed to some, without interruption and without objection. It was unfair, and is always unfair, to those who are licensed to use the particular article or method, under letters patent, to allow others to use what the licensees have a right alone to use under the license."

And, finally, this Court said, in this very case, when heard upon the motion for a preliminary injunction:

"The Dentists have been in the habit of using it for a number of years, and until lately without any question as to their right to do so. They have acted on the supposition that the owners of the patent had acquiesced in the use of the article for Dental purposes; and they resent any prosecution against the Dentists for infringement. The only question that can possibly arise is that of infringement. That I have not pretended to examine. It will undoubtedly be an interesting question, whether the use of this article under the circumstances connected with the case, is an infringement of the Goodyear patent. If that question should ever come fully before the Court, it will be the duty of the Court to investigate it fully, and endeavor to arrive at a satisfactory conclusion. There may be some circumstances, possibly, that will justify the Dentists in the use of this article. It appears that what is called the Hard Rubber Company were in the habit for years of selling to Dentists their material, of which this vulcanite was made, and in connection with it selling also the machinery necessary to manufacture it for Dental purposes. It will be claimed that here was acquiescence

on the part of the owners of the patent in the use of this article by Dentists for Dental purposes, that released them from liability as infringers."

S. S. FISHER.

PATENT LAW CASE—"HARD" INDIA-RUBBER—SIMPSON'S DENTAL RUBBER.

UNITED STATES CIRCUIT COURT—SOUTHERN DISTRICT OF NEW YORK. BEFORE JUDGE BLATCHFORD.

"*Henry B. Goodyear, administrator of Nelson Goodyear, et al.*, vs. *George Evans.*—This was an application for an injunction to prevent the defendant from infringing patents issued to Nelson Goodyear, afterward reissued to the above-named plaintiff, covering the invention of 'hard' India-rubber. The patents were sustained by this court in the case of Goodyear *vs.* The New York Gutta-percha and India-rubber Vulcanite Company, and of Goodyear *vs.* Wait, which latter case involved the use of hard India-rubber for dental purposes. The defendant in this case was proved to have made dental plates for artificial teeth in accordance with a patent granted to Edwin L. Simpson.

"The specification of the Simpson patent says: 'The rubber now used for dental purposes has incorporated with it large proportions of free sulphur, for the purpose of vulcanizing the rubber after it is formed.' It is evident that by 'rubber' here is meant the compound of India-rubber and sulphur, before it is vulcanized, and in the condition in which it is when prepared for dental purposes, and ready to be vulcanized. The specification proceeds: 'The odor and taste occasioned by the presence of this sulphur is extremely obnoxious to many persons, and occasions the principal if not the only objection to the use of rubber for dental purposes. To overcome this objection and produce vulcanized rubber for dental purposes without the actual or apparent presence of sulphur, is the object of my invention, and consists in preparing the rubber for vulcanizing by the introduction of a peculiar vulcanizing compound.' The patentee then describes the mode of making this vulcanizing compound. He says: 'I first boil linseed or other vegetable oil to the consistency of honey (this I do to facilitate the preparation), thoroughly mix two ounces of benzoin gum with one pound of pulverized sulphur, then to each quart of the boiled oil add one pound of the prepared sulphur, carefully subjecting this mixture to a moderate heat, sufficient only to cause the two substances to react upon each other, until they pass from a semi-fluid to a semi-hard state, having a honey-comb or spongy appearance.' He also says that the benzoin gum, 'by its vaporizing qualities, more perfectly expels the fumes of the sulphur, as well as the odor, from the oil, and renders the compound nearly if not perfectly odorless, and when combined with India-rubber or similar gum, and subjected to a regulated heat, will cause the same to undergo the change known as vulcanization.' To produce the rubber for dental purposes, he adds to one pound of India-rubber from ten to fourteen ounces of the vulcanizing compound, twelve ounces being the proper quantity for general purposes, the hardness of the rubber, after curing, increasing with the increase in the quantity of the vulcanizing compound. The compound and the rubber are thoroughly mixed by being ground between warm rolls, and coloring matter is put in if desired. The mixture

is plastic, and is rolled into thin sheets, and is then ready for the dentist's use. The dentist forms the plate in the ordinary manner of other rubber, and then vulcanizes it by subjecting it to a heat of 320° Fahr., for about four hours, or for a proportionately less time with a higher degree of heat. Otherwise, it is treated as ordinary rubber, 'and the plate thus prepared will be as tasteless and odorless as metal plate, and will not tarnish the fillings or other gold in the mouth of the wearer.' The claim of the patent is this: 'Combining the within-described vulcanizing compound with India-rubber in the proportions herein named, and substantially in the manner and for the purposes specified.'

"*Held by the Court.*—That the specification of the Simpson patent does not pretend that the product formed by combining the vulcanizing compound with India-rubber, and subjecting the mixture to heat, until it undergoes the change known as vulcanizing, differs in any of the qualities or properties or capacities from the product formed according to the Nelson Goodyear patents, except in being tasteless and odorless. It is not pretended that it does not possess all the properties which are possessed by the product of the Nelson Goodyear patent.

"That this product may be an improvement and patentable, and yet it does not follow that it can be made or used without the permission of the owners of the Nelson Goodyear patents.

"That on the affidavits of the experts, the article made under the Simpson patent, before analysis, has the properties of the Nelson Goodyear hard rubber, and the analysis of it shows that it contains not less than four ounces of sulphur to a pound of rubber, and nothing more is needed to show that the use of it, and the manufacture of it, are infringements upon the plaintiff's patents. That the Simpson patent is evidence merely of the novelty of what it claims—that is, the combining with India-rubber a compound composed of benzoin gum, sulphur, and oil, prepared in the manner stated. A patent for such combination cannot confer upon the holder of it even a *prima facie* right to make the combination, without the license of a person holding a subsisting prior valid patent for the combination of sulphur and India-rubber, without the benzoin gum and the oil, any more than the patent to the latter can confer upon the latter the right to make, without the consent of the former, the combination covered by the patent held by the former. The defendant furnishes no evidence, by analysis of the Simpson rubber, to controvert the analysis testified to by the plaintiffs' experts, and all the affidavits on the part of the defendant as to the quantity of sulphur contained in Simpson's vulcanized product, and as to the question of non-infringement, are altogether vague, general, and unsatisfactory, and the defendant does not satisfactorily meet the deductions and calculations drawn by the plaintiff's experts from the language of the Simpson specification. No case has been cited in which an injunction has been refused where the subsequent patent set up by the defendant contained in itself satisfactory evidence on its face, when read by experts, that its process involved an infringement of the prior patent. The Simpson patent, in the sense of the law and of the decisions as to granting injunctions, is not an adverse patent, or one for the same invention as the plaintiff's, or one conferring upon its holder any *prima facie* legal authority to use in working it anything before patented by the Goodyear reissues. An injunction must be issued as prayed for.

"For complainants, Mr. Keller, Mr. Pollock, and Mr. C. F. Blake; for defendant, Mr. Law and Mr. H. T. Blake."—(*American Artisan.*)

PERISCOPE OF MEDICAL AND GENERAL SCIENCE IN THEIR RELATIONS TO DENTISTRY.

BY GEO. J. ZIEGLER, M.D.

Defective Alimentation a Primary Cause of Disease.—Prof. J. H. SALISBURY closes an instructive paper in *The St. Louis Med. Reporter* with the following summary of many of the interesting and important results arrived at in an inquiry upon this subject:

"1. Vegetable food, and especially that of an amylaceous and leguminous character, when too exclusively and continuously used, produces constipation and fermentative and scorbutic conditions.

"2. These conditions show themselves in the following abnormal states: The formation of fibrinous masses (emboli) in the capillary vessels of sensitive, irritated and irritable parts, resulting in congestions, inflammations, diarrhœa, paralytic tendencies, loss of voice, and diseases of the eye and ear, with pains and aches in the extremities and back; and also a disposition to cell development, from which result tubercular depositions in the lungs.

"3. The abnormal conditions excited by an amylaceous and leguminous diet require, as dietetic and remedial means, albuminous animal food, instead of vegetable, with anti-fermentatives for controlling zymotic action. In connection with which are indicated the vegetable acid salts of potassa and iron for promoting the solution of the fibrinous clots and thinning the blood, and promoting intestinal absorption and secretion.

"4. These conditions in armies are developed mostly during and immediately following campaigns, when the men are confined too much to an amylaceous diet.

"5. The officers, who can and do carry a variety of food, with the means of cooking it, are exempt from this class of diseases.

"6. The first manifestation of abnormal tendencies, after beginning to feed too exclusively upon amylaceous and saccharine food, or on any of the products of their fermentation, is *constipation* and dyspeptic symptoms.

"7. This constipation is soon followed by fermentative changes, and the development of intestinal gases and yeast plants in the food too long delayed in the alimentary canal.

"8. That as soon as gases begin to develop in the intestinal canal, yeast plants begin to develop in the alimentary matters to an abnormal extent.

"9. That this development of yeast plants is evidence of the inauguration of fermentative changes in the starchy food.

"10. That this fermentation and development of yeast plants continue to increase till diarrhœic conditions are produced.

"11. That a peculiar gelatinous, colloid matter—usually in little masses scattered through the feces—shows itself to a greater or less extent as soon as the diarrhœa commences; that generally this (colloid) matter is present in direct proportion to the severity of the disease.

"12. That this colloid development is not the cause of the diarrhœa, but merely the consequence of certain saccharine and fermentative con-

ditions of the system, in which state the alimentary canal becomes a proper nidus for its development. As soon as these systemic conditions are overcome, this colloid matter ceases to develop and disappears entirely from the feces. It hence may be regarded as merely the consequence, and not the cause, of certain systemic conditions. Its development appears, however, to act as poison, and increases the intestinal lesions.

"13. That the system, on the amylaceous diet, becomes highly saccharine and fermentative, so that even the mucous secretions often contain sugar, and rapidly pass into fermentative states, developing yeast plants.

"14. That this saccharine condition is abnormal, and appears to be a peculiar type of the so-called *scorbutic taint*, and yields more readily to an *albuminous animal diet*, with anti-fermentations and the vegetable acid salts of potassa and iron, than to any other dietetic and remedial means.

"15. The fermentative changes in the alimentary canal are always more active towards evening and during the night, and go on increasing from day to day until

"16. Finally the gases and yeast plants developed produce so much intestinal irritation that diarrhœa ensues, which soon becomes chronic, and not at all amenable to the treatment of ordinary diarrhœic conditions.

"17. Accompanying the fermentative changes is always a paralytic tendency more or less strongly marked. This is manifested in the alimentary canal, and especially in the large intestines, next in the extremities, the legs prickling and 'getting asleep' frequently, with ringing in the ears, and a numb, mixed-up-confused feeling in the head, etc.

"18. This paralytic tendency appears to arise from defective nutrition and the pressure produced by the clogging up of the capillary vessels with the fibrinous masses, from which result serious congestions, etc., as in the intestinal walls, lungs, nerve centres, etc.

"19. A cough, with more or less hoarseness, usually sets in, especially during the night and on getting up in the morning, accompanied by the expectoration of a thick, sweetish, cream-colored mucus.

"20. This is followed by more or less constriction in breathing, with frequently palpitation of the heart on any excitement.

"21. After the diarrhœa sets in, there is usually a remarkable tendency to fibrinous depositions in the heart (thrombosis) and to the clogging up of the pulmonary vessels with fibrinous masses (emboli), with tubercular tendencies and pains and aches in the extremities and back, simulating those of muscular rheumatism.

"22. The disease so fatal to animals, known as 'hog cholera,' is the same abnormal state of the system as the chronic diarrhœa of armies.

"23. Both arise from the same cause, viz., the too exclusive feeding upon amylaceous or saccharine food, or upon the products of their fermentation.*

"24. One of the primary lesions appears to be the clotting of the blood in the capillary vessels and heart.

"25. There is a strong probability that the conditions of the system,

* The diarrhœa is but one expression or symptom, out of many, of the peculiar systemic abnormal conditions excited by such food.

which result in diabetes, are similar to those producing chronic diarrhœa, and that the causes are analogous.

"26. There is also evidence that the conditions of the system which result in bronchocele, are similar to those which give rise to chronic diarrhœa.

"27. There is strong evidence also that the condition of the system which gives rise to summer complaints and fluxes in children, especially those where the stools are gelatinous and green (the so-called colloid matter), are similar to those that result in chronic diarrhœa. They appear to arise from the too exclusive and continued use of starchy and saccharine substances and fruits, which children are largely indulged in.

"28. The jelly-like matter of chronic diarrhœa is colloid, and emanates from the epithelial tissues of the alimentary walls.

"29. That this colloid matter is not the cause of chronic diarrhœa, but merely the consequence of certain glycogenic conditions of the system, brought on by feeding too exclusively upon amylaceous food; that after it begins to develop in the alimentary canal, it tends to exhaust the system and aggravate the lesions and the disease.

"30. That sugar, vinegar, carbonic acid and even alcohol beverages, when too exclusively and continuously used, tend to produce similar conditions of the system with that of amylaceous food.

"31. That amylaceous and saccharine matters, with all the products of their fermentation, when too exclusively and continuously used as food, or taken into the system in any way, result in similar lesions and abnormal conditions, and tend to produce in the heart and large vessels fibrinous depositions, which result in thrombosis and embolism, in congestion and hepatization of the lungs, congestion and inflammation of the intestinal walls, with the damming up of the blood in the capillaries that nourish the nerve centres and extremities, resulting in paralytic tendencies, with sometimes loss of voice and diseases of the eye and ear.

"32. That these make up the great mass of the most obstinate, lingering, pitiful, and fatal diseases of the army, decimating it more and bringing upon it and those at home more suffering and grief than the accidents and casualties of battles and all other diseases combined.

"33. That if we would prevent these diseases, we must change the present army diet.

"34. That the *desiccated beef and vegetables* make an anti-scorbutic, anti-fermentative, highly portable, nutritious, and good diet for the soldier, and could be furnished him at a cost not exceeding the present ration.

"35. That of this food he can carry thirty days' rations in his haversack more easily than he can five days' rations of his present food.

"36. That with this food the heavy and cumbersome commissary trains that so impede an army may be dispensed with.

"37. That at present the great bulk and weight of the soldiers' food is water—a heavy and unnecessary ingredient to carry—and which makes up from five to seven pounds in every six to eight, and which he can supply at the numerous springs, brooks, and rivers along his march. In desiccated food this water is taken out and the food compressed into a small bulk, so that he can carry six days' rations of it more easily than one of his present food.

"38. That with this desiccated food he need never be wit[illegible] good

substantial diet that will sustain him during the labors and fatigues of the march, and protect him from the numerous dreaded scorbutic and fermentative diseases.

"39. That this *desiccated beef and vegetables* has already been submitted to a practical test in campaigning—in Dr. Hayes' Arctic expedition—and found to work admirably as a good nourishing, anti-fermentative and anti-scorbutic food. In Dr. Kane's expedition this food was not used, and his men suffered much from scurvy and frost-bites. In Dr. Hayes' expedition, although he reached a more northern point than any previous explorer, yet he did not have a single case of scurvy among his men nor a single frost-bite.*

"40. That beans and peas have a marked tendency to produce flatulence, indigestion, intestinal derangements, and hence they should be entirely abandoned as army food. The poor of our cities that feed upon the bean and pea soup provided for them at the public expense, are soon affected, if they live upon this food too exclusively, with diarrhœa, which is often obstinate and protracted."

Starvation.—"Dr. Austin Flint, Sen., in opening a discussion before the Medical Society of the County of New York upon Alimentation in Disease, insisted, with Chomel, that all medical theory and observation must be brought for final judgment to the bar of good sense, the true genius of medical experience. After an account of the phenomena of starvation, he remarked that for their production it is unnecessary that food be entirely withheld; starvation takes place wherever aliment is either insufficient in quantity, or unsuitable in quality, to supply the blood with all the materials for nutrition. But where the effects of innutrition are developed slowly, they are less striking, and are apt to be overlooked. Again, one part, or one tissue, may be starved, from lack of its own proper nutriment, while the rest of the system is sufficiently nourished. Recognizing these facts, we are next to consider that disease has no protective power against starvation; which is sure to occur if aliment is not ingested or not assimilated. More or less of the morbid phenomena of nearly all diseases are due to innutrition; indeed, this may often supersede the affection of which at first it was an incidental element, and prove the immediate cause of death."—(*New York Med. Record* and *Humboldt Med. Arch.*)

"*The Stomach and the Mind.*—Much of our conduct depends, no doubt, upon the character of the food we eat. Perhaps, indeed, the nature of our meals governs the nature of our impulses more than we are inclined to admit, because none of us relish well the abandonment of our idea of free agency. Bonaparte used to attribute the loss of one of his battles to a poor dinner, which, at the time, disturbed his digestion: how many of our misjudgments—how many of our deliberate errors—how many of our unkindnesses, our cruelties, our acts of thoughtlessness and recklessness—may be actually owing to a cause of the same character? We eat something that deranges the condition of the stystem. Through the stomachic nerve that derangement immediately affects the brain. Moroseness succeeds amiability; and under its influence we do that which

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* Frost-bites occur almost always in men laboring under a *scorbutic taint*. Those that are sound are seldom frost-bitten.

would shock our sensibility at any other moment. Or perhaps, a gastric irregularity is the common result of an over-indulgence in wholesome food, or a moderate indulgence in unsuitable food. The liver is afflicted. In this affliction the brain profoundly sympathizes. The temper is soured; the understanding is narrowed; prejudices are strengthened; generous impulses are subdued; selfishness, originated by physical disturbances which perpetually distract the mind's attention, becomes a chronic mental disorder; the feeling of charity dies out; we live for ourselves alone; we have no care for others. And all this change of nature is the consequence of an injudicious diet."—(*Boston Journal of Chemistry.*)

Seat of Taste.—"The *Clinique Europiénne* contains the following account of certain experiments made by MM. Klautoch and Stitch, to ascertain the real seat of the sense of taste, which is generally supposed to exist on the whole surface of the tongue, especially the anterior part of that organ, the middle of the dorsum being but feebly endowed with this sense. It seems, from these experiments, that the only portion of the tongue which is sensible to taste is a narrow space all around. The breadth of this sensitive zone varies in different subjects; in some it is not more than two lines; in others double that breadth. It rarely extends to the inferior surface. The experiments were as follows: A substance having a strong taste is first placed on the centre of the tongue, where it produces no effect. It is then gradually spread out, until the perception of taste is announced; this occurs generally on the border, but in some individuals it begins at the distance of a line from it. The *velum pendulum* of the palate is also sensible to taste; but the pharynx and the tonsils are deprived of the gustatory faculty. This is proved by the fact that if they be touched with stick caustic the patient experiences no taste, provided he keep the tongue and the velum pendulum away from the spot."—(*Chicago Med. Jour.*)

"*Researches on the Tooth-pulp.*—By Franz Boll. This paper is by a medical student of Bonn—one of Prof. Max Schultze's pupils. The points to which he has directed his attention are, first, the mode of termination of the nerves of the tooth, which is a subject as yet but little investigated; and, secondly, the relation of the intertubular dentine substance of the tooth to the tooth-pulp, and the development of the former from the latter. He has found the long incisors of rodents admirably adapted to this investigation, and in examining the nerves has made use of the terchloride of gold, which was lately recommended by Cohnheim, and used by him in the investigation of the nerves of the cornea. With regard to the first of these matters in question, he states that extremely fine nerve filaments pass between the pulp-cells, and penetrate the dentine of the tooth, just as do the processes from the peripheral cells of the pulp: hence it is necessary to distinguish two sorts of dentinal canals—those which contain processes from the pulp-cells, and those which contain nerve-fibres. Three views as to the origin of the intertubular substance of the dentine have been current: one is Kölliker's, who conceives it to proceed from the calcification of a soft matrix excreted from the dentinal cells and their thin prolongations; the second is Waldeyer's, who modifies Kölliker's view considerably, and denies the existence of a præformative membrane to the pulp. He

maintains that the formation of the dentine consists in the conversion of a part of the protoplasm of the dentinal cells into a collaginous substance, which is subsequently calcified, while the remaining part of the cell-protoplasm continues in the form of soft fibres to occupy the interior of the tube surrounded by the calcified substance. H. Hertz, in a paper published in Virchow's 'Archiv,' 1866, states that the intertubular substance of the dentine is the chemically changed and calcified intercellular substance of the pulp-cells. Herr Boll proceeds to discuss the views of Waldeyer and Hertz, but fact after fact has convinced him that Waldeyer is correct. He gives several figures of the peripheral-cells of the tooth-pulp—the odontoblasts—with from one to four processes projecting into the dentine substance. One of his sections shows the cells completely detached from contact with the dentine, excepting through their long, fine processes; and it is most clearly seen that there is no connection between the hard substance of the dentine and any intercellular matter of the pulp: in fact, no such intercellular matter exists at the periphery. The limitation of the hard substance of the dentine where it comes in contact with the cells of the pulp is termed *membrana eboris*. The multiplicity of processes from the odontoblasts, instead of a single fibril, as originally described by Lent, is an interesting observation."—(*Quarterly Jour. Microscopical Science.*)

Traumatic Lesions of Nerves.—"M. Paulet recently read at the Paris Société de Chirurgie a highly interesting memoir on the Effects of Traumatic Lesions of Nerves, in which he arrived at some remarkable conclusions. Examining in detail the results derived from experimental physiology, as reported during the last half century, he finds the general conclusion is that a divided nerve is capable of true regeneration, and that such regeneration is a *sine qua non* of restoration of the function lost by the division of the nerve. Next, the period of time requisite for this regeneration may occupy one or many months, according to the amount of loss of substance, or the degree of separation between the divided ends, while, when the loss of substance exceeds a certain limit, restoration will never be accomplished. But when he comes to examine recorded facts derived from clinical experience, he finds that they lead to very different conclusions to those deduced from experiment. The facts he has collected show that the re-establishment of function takes place long prior to the periods fixed by the physiologists, and that both sensibility and motion have been re-established, although the loss of substance in the trunk of the nerve has never been repaired. He divides his cases into two categories, those in which there has been simple neurotomy, and those in which this has also been accompanied by excision. Of the ten examples of the first which he has collected, he finds that in four the nervous influence was restored before the possibility of the production of a cicatrix permeable to the nervous influence, while in three instances the continued separation of the extremities of the nerves was demonstrated by preparations. Among the eighteen cases of neurotomy with excision that he has collected, in some the functions were very soon re-established, while in others, in which this required a much longer time, so much of the nerve had been removed as to exclude all idea of its reproduction. In some cases excision of an important nerve in no wise disturbed sensation or voluntary motion. M. Paulet passes in review the various explanations that have been

given of the return of nervous function, without finding any of them satisfactory, and he has instituted experiments on animals without obtaining any elucidation; nor does he believe that it is in this direction that the explanation will be found, clinical observation carefully conducted being really what is required."—(*Med. Times and Gaz.*)

Traumatic Division of Nerves.—"The subject of traumatic division of nerves was continued at the Paris Society of Surgery by a report of M. Tillaux on M. Paulet's interesting paper, to which we recently referred. M. Tillaux agreed with the author of the paper as to the reality of the great discrepancy in the results derived from experimental and clinical observation, the latter clearly leading to the conclusion that 'a part of the body may preserve its sensibility, although the principal nervous trunk distributed to it is no longer in communication with the encephalon.' To the cases in proof adduced by M. Paulet, other members of the Society added further examples during the discussion, but none were able, any more than the author of the paper, to give any satisfactory explanation of the difference in the results derived from experiments and from surgical practice. The most plausible was that of M. Broca. Commenting upon the explanation of the occurrence by the supposition of the existence of nervous *anastomoses*, he observed that first we must have an exact idea of what this term implies. It must not be supposed to be similar to that which takes place between blood-vessels, allowing the nervous fluid to circulate, as it were, from nerve to nerve, passing by collateral channels when one of these is obstructed. It is simply an *anastomose par accolement*, in which a nervous filament is detached from one trunk and embraces another. But this description of anastomosis may explain the great discrepancies observed after divisions or excisions of nerves:

"'In fact, just as there may be aberrant vessels, there may be *aberrant nervous filaments*—*i.e.* filaments which, detached from the principal trunk at a distance more or less near its origin, pursue a more or less long course out of the normal track, attach themselves for a greater or less distance to another nervous trunk, and then resuming their proper course, again unite with the primary trunk near to its termination. Thus a more or less voluminous filament of the median nerve may be detached from this nerve, even on a level with its origin in the brachial plexus, and in place of following the course of the median nerve, may attach itself to the ulnar, again to join the median near its termination. Suppose the median nerve to be interrupted in its continuity in any part of its course between the point where the aberrant filament is detached from it and the point where it joins it again, sensibility and motion, in spite of the solution of continuity, will not be completely abolished in the parts to which the median is distributed, because they will continue to receive their innervation, in a less complete manner it is true, by the agency of the aberrant filament remaining in communication with the nervous centre. In this manner we can very well understand the differences pointed out by M. Paulet in his memoir. There are degrees in the preservation of the nervous functions according to the number of aberrant filaments in this or that individual. It is a physiological anomaly explained by an anatomical anomaly.'"—(*Ibid.*)

"*Odontological Society of Great Britain.* Vol. v. *Transactions for* 1865, 1866, 1867.—The present volume contains an unusual proportion

of matter of general scientific interest, in addition to the communications of a more technical character. Among the former we would especially direct attention to Mr. Ibbetson's elaborate paper upon 'The Fossil Teeth of Fishes in the Palæozoic and Lower Members of the Mesozoic Rocks,' which is illustrated by numerous and very delicate engravings by Mr. Bagg. The author deals only with the great oolitic orders of Placoids and Ganoids, now but poorly represented in the waters of the globe. We say oolitic, because they attained their greatest development at this period of the earth's history, but do not imply that their remains are in any way limited to these strata, as may be well seen in the diagramatic table which accompanies the paper.

"The dentition of the mole (*Talpa Europæa*) forms the subject of a careful essay by Mr. C. Spence Bates, F.R.S. It is somewhat remarkable that as many as five distinct classifications of the teeth (or dental formulæ) of this little animal should have been proposed by as many distinguished anatomists, among whom we may mention Frederick Cuvier, De Blainville, and Owen. The author, having had some excellent opportunities of investigating the subject, supports Professor Owen's view, and represents the dentition as follows:

$$\text{Incisors } \frac{3\text{-}3}{3\text{-}3} \quad \text{Canines } \frac{1\text{-}1}{1\text{-}1} \quad \text{Præmolars } \frac{4\text{-}4}{4\text{-}4} \quad \text{Molar } \frac{3\text{-}3}{3\text{-}3} = 44$$

He also makes the interesting observation that in the young mole, 'from the feeble connection existing between the teeth and the alveolar wall, which rather appears to be undergoing absorption and waste for the purpose of the reception of the permanent set than to be closing in order to support the milk teeth, the idea is suggested that the deciduous teeth are developed according to a law of growth, but are not required to fulfill any purpose in the economy of the young animal's life.' The eruption of the permanent teeth appears to be coeval with the appearance of fur upon the back of the animal, and the commencement of its independent subsoil existence.

"A most valuable paper from the pen of Professor Owen, on the Dental Characters of Genera and Species of Fishes and Batrachia in some of the Northumbrian Coal Shales, concludes the volume. An important part of this communication consists in the accurate and beautifully-executed drawings by Mr. Tuffin West, representing sections of fossil teeth, prepared by Messrs. Craggs and Atthey; for whatever changes may be required by the advance of science in the deductions of the learned professor, these drawings will still retain their value, and will not be easily surpassed.

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"Mr. Balkwill, in a paper on the 'Best Forms of Artificial Teeth for Mastication,' draws attention to the movements of the lower jaw, and to the importance of the articular eminence in front of the glenoid fossa in enabling the molar teeth to glide forward without becoming entangled among the cusps of their opponents.

"Dr. Shortt's communication on Indian dentistry contains some interesting observations upon the effects of chewing the pawn or betel-nut, which appears to be a powerful stimulant and astringent, and gives rise to various evil effects in persons addicted to its use. The tembul, or quid, consists of the leaves of the chavica betel prepared with quicklime and chewed with portions of the areca nut and sometimes with tobacco. The prolonged use of this quid produces an unsightly shrinking of the gums, causing permanent loosening of the teeth and great discomfort,

while the teeth themselves are deeply discolored. The use of the tembul is said to protect the teeth from caries, from which the Indian population appear to be almost exempt; but we doubt whether another explanation of this fact may not be offered in the simple character of the national food, and in the scrupulous care with which the teeth are cleaned by the natives, who seem to regard this almost in the light of a religious duty.

"We have been rather amused by observing the extreme anxiety of the author of a paper on dental nomenclature to abolish the terms canine and premolar teeth, as 'not flattering to our humanity,' and tending 'to bring us down to the level' of the quadrupeds. We should hardly have expected to meet with such a sentiment as the following in any scientific work of the present day: 'For as man ranks above and enjoys the distinction of constituting a separate order by himself, so let him strive to maintain all the distinctive characters he can legitimately lay claim to, as tending so emphatically to mark his superiority over the brutes of the creation.' Surely the anatomical homologies connecting man with the lower animals do not tend to obscure the only character worth considering as the essential and distinguishing feature of man's development, but rather display the wondrous harmony pervading nature's works, while they leave us still the right to exclaim—

'A man's a man for a' that.'"

(*Ibid.*)

Closure of Jaws from Cancrum Oris.—"At a recent meeting of the Odontological Society, Mr. W. A. Harrison, F.R.C.S., brought under the notice of the society a very remarkable case of closure of the jaws by rigid cicatrices and a bony band between the jaws, which resulted from cancrum oris early in life. The most remarkable feature about the case was, however, that, owing to the destruction of the cheek, the alveoli with the permanent teeth of the right side had been developed altogether outside the mouth, the teeth having an almost horizontal direction. The unfortunate patient had grown up to manhood in this condition, and, though unable to masticate food in any degree, he was fairly nourished by introducing semi-solid food through a space left between the teeth on the sound side. Mr. Harrison succeeded in remedying the deformity in great measure by reflecting the gum from the projecting alveolus, and, after extracting the teeth, removing the bone to the level of the cheek. The patient made a good recovery from this operation, and was then admitted into St. Mary's Hospital under Mr. James Lane's care, with a view to a plastic operation upon the cheek. This was accomplished successfully also, but with considerable difficulty, Mr. Lane having to cut wide of the cicatrix, which was left *in situ*, and having then to make a free incision along the border of the jaw, in order to set at liberty the tissues sufficiently to come together. No attempt was made to relieve the closure of the jaws by either dividing the bony band between them, or by the performance of Esmarch's operation for the formation of an artificial joint in front of the disease, since the patient was perfectly satisfied with the existing state of things as regarded his powers of taking nourishment."—(*Lancet.*)

Syphilis.—*On some Exceptional Modes of the Transmission of Syphilis.*—In a paper on this subject, read before the Med. Soc. of Lon-

don, "MR. VICTOR DE MERIC urged the value of etiological investigations that are easily undertaken in cases of communicable diseases. Though the history of the propagation of syphilis is generally well understood, there is yet much obscurity as regards some modes of its transmission, and especially as to the phenomena following contamination by secondary manifestations; moreover, at the outset it is difficult to understand why primary lesions affect certain parts of the generative organs, in preference to other parts equally exposed. The evidences of contamination are usually slight—so slight, sometimes, that we fail to discover them. The author related seven examples to illustrate his remarks, which are briefly as follow: 1. A lady, aged 60, infected by her grandchild. 2. A gentleman of 40, covered with secondaries, no trace of primaries ever manifest. 3. Wife, aged 23, communicating disease to husband by buccal symptoms, no affection having followed cohabitation. 4. Mucous tubercles on vulva of girl, psoriasis palmaria following, no initial symptoms. 5. Insidious secondaries in young girl, habitually watched and examined, no primaries. 6. Unexplained mucous signs in anal region of child. 7. Severe syphilis in a newly married lady, husband ever free from disease. Mr. De Méric concluded by stating that we should not (at once) attempt to explain exceptional cases by uncharitable surmises, but study the facts indicating unusual modes of transmission of which experience convinces us.

"Mr. Henry Lee advanced an important theory, to which observation had led him—that pregnancy seems to awaken a power of transmission in the dormant virus, as if the disease germs, under such new condition, attained a higher vitality. The author replied, and in answer to Mr. Levy, stated his opinion, that the assumption of a urethral chancre was not a feasible explanation of doubtful cases, for such could scarcely exist without local symptoms leading to its discovery."—(*The Medical Press and Circular.*)

Syphilis.—"*Indurated Chancre and Constitutional Syphilis contracted in an unusual manner.* Reported by DR. A. M. SIGMUND, Shimmersville, Pa.—On August 24th, 1867, I was called to see Miss M. H., aged seventeen years, well developed, and to all appearance in good health, with the exception of a large and painful ulcer on her upper lip. Upon examination I found the ulcer to present the following characters: It was situated on the centre of the lip, extending from its anterior margin to near the frænum, oval in form, and, the lip being much swollen, about five-eighths of an inch in its longest diameter. Its surface was hollow, as if scooped out, and covered with a layer of dirty grayish lymph; the edges were hard, slightly elevated, and sloping a little from within outward; the base well defined, and very hard, feeling, when pressed between the thumb and finger, like a button or ring of fibro-cartilage.

"On inquiry, I learned that about two weeks previous the lip had become indurated at the centre, where she had a slight chap, after which the induration increased until it had involved the whole thickness of the lip, and then, about a week after, it commenced to ulcerate. On my informing her that the ulcer was undoubtedly of a syphilitic character, and asking her as to how and when she became infected, I received the following statement, which, from what I since have learned, I believe to be true: About three weeks before, she had been at a pic-

nic, and was there in company with a young man (whom *I knew* to have been laboring under *tertiary syphilis*, and had also at that time some indolent sores on the inside of his lips), and that, at one time during the day, when he had been smoking a cigar through a very beautiful amber mouth-piece, she playfully took it from him and placed it in her mouth. In the evening he accompanied her home, and in parting impressed several kisses upon her lips, one of which was rather prolonged, in order, as he said, to take a good parting kiss, as he would leave the neighborhood in a few days. She felt nothing unusual about the lip until about a week afterward, when the induration commenced; but thinks she had a slight chap, or abrasion on it at that time, where the induration afterward occurred.

"On further examination I found that no visible secondary or constitutional symptoms had as yet been developed, *and also, that there was no local disease, or evidence that there had been any, on any other part of her body.* To all appearance the disorder was as yet only local.

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"I remarked that when I first saw the patient there was only the primary sore on the lips. In the course, however, of a few weeks—about five weeks from the appearance of the local lesion—secondary symptoms manifested themselves; such as the characteristic eruption, sore throat, pain in the ears, joints, etc., and enlargements of the cervical glands, with pain extending to the mastoid processes on both sides. She suffered also for some time from rheumatism (syphilitic) of her left arm, preventing its use; she also had some non-suppurating buboes, but only on the left side. The eruption, as I have said, was markedly characteristic, and was most numerous on the forehead, scalp, face, neck, breast, and arms; there was some also on the body and lower extremities, but not so numerous. It was at its height about ten days from its appearance, remained stationary about a week, and had disappeared again in three weeks more. The sore throat—not ulcerated, but only a little inflamed—enlargement of the glands, pain in the ears, and some soreness of the joints remained some weeks longer. The whole course of treatment lasted between three and four months, when I discharged her seemingly cured. I have seen her but a few days since, and she tells me that she continues in perfect health.

"The treatment, constitutionally, consisted of iodide of potassium, in doses ranging from five to fifteen grains, three times a day, given in compound syrup of sarsaparilla, with the bichloride of mercury in half-grain doses until the gums were slightly touched, when it was omitted; morphine was given to relieve the pain.

"A few days after I was called to see this case, a young man came to my office stating that he had a sore lip, which pained him considerably, and that he felt very uneasy about it, 'especially as he had seen a lady having a very sore lip.' On asking more particularly, I learned that he had been in company with this same Miss M. H. a few days after the sore on her lip commenced, and not thinking of any danger had kissed her. The sore was not as yet large, but had the characteristic appearance of an indurated chancre. I applied nitrate of silver thoroughly then, and again in a few days after, after which it healed nicely, and then gave the usual constitutional treatment, and up to this time no constitutional symptoms have appeared.

"These cases are interesting as instances of the disease being communicated in rather an unusual channel.

"The first case is also particularly interesting, as tending to determine the mooted point as to the communicability of tertiary syphilis. There can be no question that the young man had at the time well-defined tertiary syphilis; the sore on the young lady's lip was a well-marked 'initial lesion,' and followed by 'characteristic constitutional syphilis.'"—(*Humboldt Med. Archives.*)

Syphilis.—"*On Chancres in Adults and Children, attacking unusual Positions, associated with Syphilis.* By THOMAS BRYANT, F.R.C.S., Assistant Surgeon to Guy's Hospital.—The records of cases which differ from the ordinary run of recognized disease are always of interest, and for diagnostic purposes cannot be too closely studied. In syphilitic affections it cannot be too well known that chancres of every form may be found in parts far distant from the genital organs, and that they may be produced in very different ways from the common kind of venereal affections. In a diagnostic point of view, it is a matter of considerable importance that these facts should be recognized; and as a contribution to the clinical aspect of the question, the following cases may not be without interest.

"The cases are arranged in order. The first are those of chancres as attacking adults; the last as affecting children.

"CASE 1. *Chancre of the upper lip, with constitutional syphilis.*—Annie T——, aged twenty-two, a single woman, came under my care at Guy's Hospital on September 13th, 1858, with a chancre on her upper lip of three months' standing. It was the size of a sixpence, and very indurated. For two months she had suffered from sore-throat, and had the staining of the skin which follows a specific eruption. A gland beneath the jaw was also indurated. Under the influence of iodide of potassium she rapidly convalesced.

"CASE 2. *Chancre of the upper lip and specific lichen.*—Amelia W——, aged twenty-one, a single woman, came under my care at Guy's Hospital in May, 1860, with a chancre on her upper lip of six weeks' duration. It had commenced as a fissure, and gradually spread. When seen it was as large as a sixpence. For two weeks she had also suffered from a papular eruption all over her body (specific lichen). Some Plummer's pill was given at night, and tonic mixture during the day, and in six weeks she was discharged cured.

"CASE 3. *Chancre of the lower lip, sore-throat, maculæ, and indurated glands.*—John H——, aged thirty, came under my care at Guy's Hospital, April 29th, 1861, with a chancre on his lower lip of one month's duration, sore-throat, and indurated submaxillary glands. Some specific maculæ also appeared over his body when under treatment. He rapidly convalesced under the influence of the iodide of potassium.

"CASE 4. *Chancre on lower lip; specific maculæ and indurated glands.*—Emma F——, aged twenty-two, came under my care in January, 1862, with a chancre on her lower lip, maculæ over the face and body, and indurated submaxillary glands. The chancre had existed eight weeks; the other symptoms about six. A grain of iodide of mercury was given every night, and three grains of iodide of potassium with cinchona three times a day. In about two months she was convalescent.

"CASE 5. *Chancre at the corner of the mouth; no constitutional symptoms; inflamed submaxillary glands.*—Ann L——, aged seventeen, came under my care at Guy's Hospital on the 11th of July, 1864, with a soft chancre at the corner of her mouth, of three weeks' duration, and inflamed submaxillary glands. Under tonic treatment the sore healed and the inflamed glands subsided, the patient leaving the hospital cured in about one month.

"In none of the cases just related could any history be obtained as to the means by which the lips became inoculated with the disease; and in none of the examples in which the chancre occurred in women was there any evidence of any vaginal affection. In the single male example the penis was clean.

"CASE 6. *Chancre on the forearm; constitutional syphilis.*—A man came to me in November, 1866, with an indurated chancre on his left forearm, the size of a shilling, of six weeks' standing. When under observation a specific lichen came out all over his face and body. He had no disease on his penis, nor was he able to account for the chancre on his forearm. By taking quinine with the iodide of potassium all his symptoms disappeared.

"CASE 7. *Chancre on the nipple: constitutional symptoms.*—In 1865, a girl, aged nineteen, came to me with an undoubted chancre of the nipple, which had existed a month; in another month specific maculæ appeared over the body, with sore-throat. She had no vaginal disease of any kind; but she admitted that her 'young man,' who had an eruption on his face and hands, had manipulated her breast and had kissed it. Under treatment with iodide of potassium and bark she convalesced.

"CASE 8. *Chancre on the fingers; specific lichen; recovery.*—Nathaniel S——, aged twenty-five, a laborer, came under my care, at Guy's Hospital, on September 15th, 1864, with three chancres on the tips of the three fingers of the right hand of three months' duration. He had also a specific lichen all over his body of six weeks' standing. His penis was free from disease. He had grazed his fingers at his work a few days before the sores appeared. and had 'fingered women.' By the use of iodide of potassium and bark he rapidly recovered.

"CASE 9. *Chancre on the cheek, specific maculæ, and sore-throat, following a scratch from a man who was suffering from syphilis.*—William H——, aged twenty-two, came to me, at Guy's Hospital, on November 17th, 1866, with a large chancre on his left cheek, with an indurated base, of nine weeks' duration. It appeared after a scratch he had received from a fellow-laborer who had syphilis. The cervical glands in the left side were much indurated. On the 15th of December, maculæ appeared over his face and body, and sore-throat soon manifested itself. With quinine and iodide of potassium all the symptoms subsided. On the 4th of February the chancre had healed; and by the 18th of March every other symptom had disappeared.

"CASE 10. *Chancre of the lip in a boy; constitutional syphilis.*—Thomas J——, aged seven years, a healthy lad, was brought to me, at Guy's Hospital, on February 14th, 1867, with a chancre on his lower lip of three weeks' duration. He was presented by his father, who had been under my care some years previously with a tubercular syphilitic disease of the face and body after a chancre which he had contracted some months before. Three years ago also, he had again been under my

care for a syphilitic cellular membranous ulcer on the leg. When he came with his son his tongue was slightly affected with disease. Specific tubercles and scales subsequently appeared over the boy's face and body. Under the iodide of potassium the boy is now well. The father stated that he was very fond of his boy, and was constantly kissing him. It is probable that it was by such means that the disease had been conveyed.

"CASES 11, 12. *Syphilis in two children of the same family; father and mother healthy.*—David G——, aged seven, came under my care on March 15th, 1866, with a specific tubercular eruption about the scrotum and thighs, also about the neck. It had been coming on for several months. This boy had slept with his uncle, a young man of eighteen, who had a like eruption.

"Sarah G——, the sister of the above, was also brought to me the following week with specific tubercles about the buttock and condylomata of four months' duration.

"The father and mother of these children were quite healthy.

"Under treatment both these cases recovered. The iodide of potassium in some tonic mixture was the medicine employed.

"CASE 13. *Syphilis in a child aged four.*—Henry F——, aged four, was brought to me on August 19th, 1858, with a tubercular and scaly eruption over his body and face, of three months' duration. The mouth and anus were also the seat of ulcerating condylomata. No history of syphilis could be obtained from the parents. Mercury with chalk, one grain, and dried soda, four grains, were ordered twice a day. By September 5th the ulcers at the anus and mouth had healed, and the eruption was fading. All symptoms had disappeared by the 25th.

"CASES 14, 15. *Syphilis in a child, aged seven years, with chancre on lip; also a brother of the above, aged ten months.*—Walter B——, aged seven, was brought to me on March 21st, 1858, with an indurated chancre on the lower lip of five weeks' standing, and a scaly eruption all over the body. Under treatment recovery took place.

"A brother of the above, aged *ten months*, was also brought to me at the same time with a specific eruption over the body.

"The parents had lost one child two years previously at the age of six months with a skin eruption. The father had had syphilis before marriage. The mother had never had any symptoms of disease."—(*Lancet.*)

Chloride of Gold as a Reagent.—The *Lancet* states that Cohnheim "employs and strongly recommends as a reagent an aqueous solution of chloride of gold (half per cent.), with a few drops of acetic acid, which colors the nerves and cellular particles red, blue, or violet, while it is without action on the intercellular substance."

"*Distinction of Gold and Silver in Alloys.*—When to a surface of pure gold or silver a drop of a solution of pure nitrate of silver in distilled water is applied, neither the solution nor the surface undergoes any change, provided no baser metal is present. But if the latter be the case, if the metal be in part a baser one or an alloy of such, the solution of nitrate of silver always produces at once a black stain; for the base metals precipitate the silver from its solution, while silver or gold are without action on it. The ordinary (14 carat) gold ware, also, does

not affect the silver solution. On gilt or silver-plated ware the black stain appears only after a time, according to the depth of the coating and the strength of the solution, the best concentration being a solution of nitrate of silver in from 2 to 5 parts of distilled water (or ice-water); for alloys in imitation of gold or silver, a solution of 1 to 15 or 20. [This method, which has been published in a number of European journals, does not seem to us so free from the objection of deceptive indications as the author of it supposes, and we believe that it will only answer in a very few cases, those, namely, in which the ware is free from copper."—ED.]—(*Drug Circ. and Chem. Gaz.*)

"*Melting Metals in Metals.*—In a recent lecture on alloys by Dr. Matthiessen, in order to illustrate the difference between chemical combination and the solution of metals in metals, the lecturer plunged a rod of gold and another of copper into separate portions of molten tin contained in small crucibles heated by the flames of Bunsen gas-burners. The gold combined rapidly with the tin; but the copper rod, though previously tinned to insure perfect contact between the two metals, was not perceptibly affected. To appreciate the importance of these phenomena we must remember that the fusing points of gold and copper are almost identical, and far higher than the fusing point of tin. By a modification of the experiments performed with the molten tin the difference in the behavior of gold and copper was exemplified in a still more striking manner. A gold rod superficially tinned when held in the gas flame melted at once like a rod of pure tin, while a tinned copper rod exposed to the same temperature remained unaffected as a whole, though the coating of easily fusible tin melted"—(*American Artisan.*)

Casting Metal in Plaster Moulds.—A. C. Small writes to the *Sci. Amer.*: "I see one of your correspondents speaks of plaster of Paris for moulds for castings of low fusible metals, and recommends that the mould be subjected to a heat of 400° F. I must differ with the writer. I have had some experience in the use of plaster of Paris for moulds, and I found the best plan was to dry the moulds perfectly in open air. When about to use them, I warm them just enough so that they would not chill the metal when poured in. After warming I held them over a flame that produced a good deal of smoke, until the inside of the mould was completely blackened over. Then I could get about two hundred castings from each mould, after which the plaster became soft and small particles broke off. Upon examining I found the plaster was burnt and of no further use for moulding purposes."

Old Files Utilized.—The *Sci. Amer.* says that old files "make excellent hand turning tools. For this purpose the end merely has to be ground to the proper shape. Probably to the hand-tool turner no implement is susceptible of a greater variety of adaptations than a turning tool made from a triangular or three-cornered file, while the flat files make superior chisels for finishing plain work, and the square file becomes both a roughing and finishing tool. Old files make good scrapers. For this purpose they must, sometimes, be partially forged, enough to turn their ends at an angle to the file. In this case—and in all others where files are subjected to the action of the hammer—the portion to be forged should be ground until every mark of the teeth is obliterated. No matter how

careful the heating and the hammering, if a vestige of the teeth is left the result will be a weak place, a 'cold shut,' or a crack in the tool. It is useless to attempt to forge a good tool, as a cold chisel or turning tool, from an old file, unless the teeth of the file and their marks are all obliterated by the grindstone; the indentations seem to enlarge and expand by the heat and show themselves in serious fractures at the most inappropriate time. Treated in this way, old files may be wrought into dies for screw cutting, punches, small cold chisels, keys, and many other articles and appliances continually needed in the shop. The work of grinding can employ the leisure hours of apprentices, and if judiciously performed, it will, at the same time, tend to true the face of the grindstone. Any of these ways of utilizing old files we believe to be preferable to the mistaken economy of paying for their recutting and worrying over their unsatisfactory after-performance."

Files Renewed.—It is stated (*Ibid.*) that "partly worn files may be renewed in a degree by standing the files, tang down, in a jar of dilute nitric and sulphuric acid, letting them stand over night."

"*Antiseptic Properties of Ether.*—M. MARTIN states (*Comptes Rendus*) that ergot of rye, cantharides, portions of meat, and various other substances liable to attack from worms, insects, or putrefaction, may be preserved by being moistened with sulphuric ether, and kept in hermetically-stopped bottles."—(*The Student.*)

BIBLIOGRAPHICAL.

A Manual of the Dissection of the Human Body. BY LUTHER HOLDEN, F.R.C.S., Assistant Surgeon of, and Lecturer on Anatomy at, St. Bartholomew's Hospital, London; with Notes and Additions by Erskine Mason, M.D., Demonstrator of Anatomy at the College of Physicians and Surgeons, and Surgeon to the Charity Hospital, New York. Illustrated with numerous wood engravings. New York: Robert M. DeWitt, publisher, No. 13 Frankfort Street.

As a manual of dissection this work will prove a valuable guide to those seeking a practical knowledge of anatomy. It is well arranged and admirably adapted to the needs of the student in teaching how to dissect and explaining the sections as they are made, assisting the learner by illustrations, with the names of parts attached, and notes on surgical anatomy. It contains also tables of the chief arteries, veins, and nerves, with a functional classification of muscles. Its value is increased by a full index, good paper, clear print, and neat binding.

The Endoscope and its Application to the Diagnosis and Treatment of Affections of the Genito-Urinary Passages. Lessons given at Necker Hospital, by A. J. DESORMEAUX, Surgeon of the Hospital, Member of the Surgical and Anatomical Societies of Paris. Translated by R. P. Hunt, M.D. Reprinted from the Chicago Medical Journal, Chicago. Robt. Fergus Sons, printers, 12 and 14 Clark Street, 1867.

This is an instructive monogram on a subject of much interest to the general surgeon and others engaged in physical explorations of the interior of the body.

THE

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ORIGINAL COMMUNICATIONS.

DENTITION—ITS PATHOLOGICAL AND THERAPEUTIC INDICATIONS.

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(Continued from page 25.)

In previous papers we reviewed sufficiently close the various causes that may prove inductive of disordered dentition, and in conformity with our plan we will now reverse the condition of things, and observe abnormal dentition as a cause of various other disorders, examine the nature of each somewhat superficially, and indicate the therapeutic means usually employed for their removal.

While there would be but little difficulty in obtaining assent to the proposition that disordered dentition may, under favoring conditions, prove the exciting cause of *almost any affection*, we do not propose to enter into so extensive a field of medical research, but design noticing only the more prominent ailments which may be traced to such cause.

It is almost impossible to classify or systematize them, for they are so distributed as to possess but few characteristics in common; therefore we will commence with the local or oral manifestations, and follow with the others as may seem best, reserving the most prevalent, viz., the nervous affections, until last.

We all of us view dentition as a strictly physiological process, and in a child whose organism is strong, and in whom no predisposition to morbid action exists, it is rarely accompanied with any great suffering or danger; yet to the presence of any perverting tendency, whether congenital or the result of an omission in one or more of the directions already noticed, such as bad nursing, confined air, undue exposure, etc., much suffering is entailed, and diseases established which prove alarmingly violent and fatal.

In many cases there are no symptoms at all, but in the greater num

ber, with the commencement of dentition, the mouth becomes hot and red, and the gums, with the exception of the tense membrane directly covering the advancing teeth, somewhat swollen and tender; the secretion of saliva becomes more profuse and viscid, the fingers are constantly thrust into the mouth, and pleasure denoted in having the gums rubbed or pressed; slight febrile reaction is manifested by the warm hands and head, flushed face, intense thirst, and a disordered condition of the bowels; the stomach is morbidly irritable, vomiting easily excited, and a very acid smelling material frequently thrown off; the urine becomes scanty and high colored; eruptions appear upon the face and behind the ears, and sometimes result in ulceration; the sleep is restless and broken, the appetite capricious and poor, the child is extensively fretful, and gives to the experienced eye these and many other indications of being sick.

When the vitality of the patient is good, such manifestations continue for about a week, and gradually subside upon the partial protrusion of the tooth, but often recur several times, although with less violence, until the tooth is fully liberated.

These symptoms may occur with but one pair of teeth and then cease, or may in an unfortunate case attend the entire process of eruption.

Instead of subsiding, however, the symptoms may become aggravated; the fever increases, the thirst becomes consuming and pitiable to witness, the little sufferer instinctively grasping the vessel and holding it to his lips; respiration becomes more frequent and fitful; the head aches, as evinced by the corrugation of the brow; the eye becomes very sensitive to the impression of light; the excretions and secretions become scanty, the urine red, and the fæces dry and hard; vomiting and diarrhœa cease from exhaustion, and finally the previous depression of strength and highly irritable condition of the nervous centres favor the occurrence of convulsions, slight at first, but so rapidly increasing in force and frequency as to speedily prove fatal.

These indications may not all present in an individual case, yet a sufficient number will occur to render the diagnosis easy and direct the course of medication in the proper channel. Now, the treatment of dentition is both surgical and medical, local and constitutional, and, without stopping to point out the general indications in the cases just described, we shall proceed to first give a description of the various symptoms individually, such as inflammation of the gums, fever, diarrhœa, vomiting, etc., and state the principles upon which they are to be met; or, in other words, first consider the medical treatment, and reserve for the final pages an explanation of the object of surgical interference and the method of its execution.

The first local disturbance claiming our notice is the unhealthy condition of that tissue which is most impinged upon by the coming tooth, viz., the gum; this is generally restricted to simple congestion, but will

occasionally eventuate in inflammation, when it is known by the term *Gingivitis.*

As we have already remarked, this tissue is among the first to suffer, and its involvement will frequently occur without the slightest external evidence; when, however, the inflammatory action supervenes, the indications are plainly marked.

When the gums are simply irritated or congested, pressure, as in other parts similarly affected, will prove ameliorative,—whether by unloading the distended capillaries or opposing the passage of abnormal nerve force I cannot say, but that such a result follows is sufficient for us to know; and to profit by the knowledge, we advise the child to be provided with a ring or rod of some slightly yielding material, such as gum caoutchouc, for the purpose of biting upon, to relieve the pain, if not also to hasten the process of absorption.

Gingivitis may be slight and of short duration, or it may be so severe as to produce extensive ulceration, and even eventuate in the destruction of the alveoli and teeth, especially if the constitutional powers of the child be much below the average standard.

The gums become of a deep red or livid color, swollen, and so painful as to frequently cause the entire refusal of spoon victuals; "the child is in general very languid, with a hot and dry skin, a small and quick pulse, impaired appetite, and considerable thirst; the sleep is seldom much disturbed, and in some cases there is increased somnolency."

When ulceration occurs, it extends very rapidly in its destructive course; provokes a copious flow of fetid saliva, and occasions an offensive breath; the gums upon pressure yield a sanious fluid, and the bowels become excessively profuse in their secretions.

In its early stage, astringent, emollient, and antiphlogistic applications are required; a solution of acetate of lead (5 grs. to the ounce of water) may be applied with a soft sponge or dossil of lint; a saturated solution of nitrate of potossa may be painted the same way, three or four times a day, over the gum with a camel's-hair pencil; scarification has been advised, and in the earlier stages might prove useful.

The bowels should be freely opened by means of calomel and magnesia, followed a few hours after by a dose of castor oil; the tepid bath should be daily employed, and the diet restricted entirely to milk and farinaceous substances, the omission of even the latter being preferable.

When ulceration has taken place, astringent applications are found beneficial. The following preparation has been recommended by Dr. Condie:

℞.—Corticis querci, ℥j.
Aqua, Oiss.

Boil to a pound and strain, then add

Sulph. alumen, ℈j.

S.—To be applied several times a day.

The substitution of some other astringent for the alum would be preferable, for we are all familiar with its injurious effect upon the dental tissue, and would reasonably expect it to be more powerfully destructive of these structures in their semi-developed condition.

Tannin, kino, krameria, sulphate of copper, and various similar remedies will likewise meet the case; the latter, however, has proven very efficacious when others have seemed inert. Chloride of lime and hydrochloric acid have also been found beneficial, and the following prescription from the same eminent source offers inducements for a trial:

℞.—Acid hydrochlor., ʒss ad ʒj.
Mellis,
Aqua rosæ, āā ℥j.
S.—To be applied three or four times a day.

In conjunction with this topical treatment, close attention should be given to hygienic measures, and when the strength of the child seems materially impaired, great local as well as systemic benefit is derivable from the administration of tonics, such as the cold infusion of bark, quinia, iron, etc., and in the cases of infants, tinct. of Erigeron Canad. offers many advantages on account of its easy administration and prompt results.

It is readily seen how an inflammatory action originating in the gums may from continuity and contiguity involve other organs in the vicinity; or on the other hand it may originate as stomatitis in other parts, and implicate the gums from the same causes.

Either originally or from primary inflammation in the gums as the result of dentition, we may have glossitis or inflammation of the tongue. This is a very painful and troublesome affection, from the constant activity of this member, and the function of the gustatory papillæ being destroyed, the relish for food is entirely lost; it is not considered serious unless threatening extension into the larynx or pharynx, when active measures are demanded.

The treatment is founded upon general antiphlogistic principles, and differs to no extent from the directions given for gingivitis; the old domestic applications of alum, sage-tea, and honey prove very useful, made pretty thick, and applied with the fingers or a piece of sponge.

℞.—Salviæ, ℥ss.
Aqua bullientis, Oss.
Make infusion, strain, and add
Aluminis, ℥ss.
Mellis, f℥j.
S.—Use as directed.

THE MICROSCOPY OF THE LIVING TISSUES.

BY PROF. RUFUS KING BROWNE, NEW YORK.

THE microscope is an instrument by means of which we are enabled to discern matters and inequalities in form of the constitution of matters, not otherwise perceptible. Such inequalities form differences of shape, opacity, or density, and other characters of combination or structure appreciable to sense. Of *matter* itself it tells us nothing, but only of variations in its forms.

The instrument once was a single transparent glass convex lens in a setting. Now it is an arrangement of several combinations of lenses cemented together, set one after another, and two other single convex lenses. The former series, called the objective, form the front part of the instrument; the latter lenses, the eye-piece, the hinder part. The first screws upon one end of a brass tube—the main tube,—and the second fits in the other end.

These three *combinations* of, 1st, compound lenses; 2d, the brass tube; and 3d, the two single lenses, constitute the compound microscope. If supported on some form of tripod, foot, or pillar, the arrangement is called a "stand."

If this support is surmounted by a long rest or slide for the main tube, upon which by a rachet it moves to and fro, we have the best form of stand. The tube excludes all light except that transmitted through the lenses, which are entirely uncovered, except where bound by the setting. The light by means of which observations are made, is reflected upward into the front part of the instrument—the objective—by a concave mirror fixed just below, upon which it has *converged*, from the sky, sun, lamp, or other source of illumination. Situated in front of the "objective," its upper surface at right angles to the plane of the tube, is a flat plate—the stage—in the middle of which a circular hole has been cut, and through this hole the light proceeds from the concave mirror below. In contact with the surface of the stage is placed the slip of glass, upon which the object is laid for observation.

We have then as the constituent parts of the compound microscope:

First, the objective, a series of compound lenses.

Second, the main tube.

Third, the lenses of the eye-piece.

These are the *essentials* of the compound microscope. The stand, mirror, and stage may be removed without taking away the microscope. The series consists of three combinations with cement, each of two lenses, flint and crown. The combinations are "mounted" or set one after the other, a little space intervening between them. The front ward is the anterior combination; the second, the middle combination; the third, the posterior combination. At the other end of the tube are

situated—a little more distance between them—the other two single lenses of the eye-piece. The middle and posterior combinations are mounted at a certain fixed distance from each other, and together they may, by a screw "adjustment," be moved nearer to or farther away from, the anterior combination. The main tube may slide to and fro, carrying its lenses at either end, close to or away from the object on the stage.

When the microscope is arranged for observation, the observer's eye near to the outermost lens of the eye-piece, the glass slip upon which is laid the form to be observed resting flat upon the stage over the hole in it, the concave mirror is turned with its face at such an angle as to receive and reflect the light directly upon the object. If this be transparent or nearly so, the light will pass through it to the front lenses, and be transmitted by them directly through the tube and back lenses to the eye of the observer. It will carry with it an image of the object, which falls upon the seat of vision, the retina. This is what occurs when the image of an object is thrown upon the retina, in seeing with the unaided eye.

But the light through the microscope transmits an extraordinary image—namely, one which is more or less magnified. This enlargement is due to the optical power of the lenses. The power varies with the depth of curvature of the lenses. Hence the image of forms of structure or other characters appreciable to sense, of matters too minute to be seen by the unaided eye, become by the microscope sufficiently enlarged to be distinctly seen.

For illustration: if at a considerable distance from a wood or forest I look at it, I see only a dark irregular *mass* extending over a segment of the horizon. In this view I do not distinguish a single one of the trees, neither the twigs, leaves, nor parts forming the leaf, which together constitute the whole of the dark mass. I may see *parts* of that mass, but none of its component forms of stems, twigs, leaves, etc., and if I do not already know these constituents visually and get no other view, I remain forever unknowing of the components of the forest. If I visit it, I see all these constituents of it. Now the difference here worded is precisely analogous to the difference between vision by the unaided eye and that by the microscope. Forms, which really constitute the mass, it being simply the aggregate of those forms not distinguishable in the one instance, are plainly seen in the other.

As the microscope has been the last of scientific instruments to be completed, IT IS IN THE ORDER OF PHILOSOPHIC IMPORTANCE THE FIRST; because it is the only possible as well as the all-effectual means by which we are enabled to ascertain the constituents of living or animate forms and organisms.

Every organ or organism, simple or compound, is composed of countless minute masses, or forms, which together *are* the organism. It is built up and completed by the coalition, or consolidation, or confluence of minute germinal masses or "units," and amorphous substances everywhere bounding them.

Now, neither the true anatomical relation nor physiological character of either of these elements—components of the organism—can be viewed except by means of the microscope. By it we may recognise them in their most intimate combination, and trace the changes in their character and their transformations singly, collectively, or in the aggregate, from the earliest to the latest moment of their constructive career. In no other way is it possible to ascertain the function of the various parts and organs of animate beings. It is only the microscope, too, which instructs us that organs and organisms are not made up by the fortuitous concourse or molecular combination of atoms, having merely physical or chemical properties, but are, on the contrary, made up of distinct though excessively minute anatomical forms, having physiological properties and peculiarities, in virtue of which they combine and reciprocally act and react on each other, and on matters brought into contact with them. But for the microscope, we should never have known that each part of every organism is nothing else than *a* sum of these minute elements of structure, and that every organism is no other than the sum total of these minute elements. Every tissue in the body, simple or compound, has been made up by them, and from first to last consists of them in their variously changed and transformed shapes. The microscope tells us that these formative elements commence their career in the construction of an organism, as living germinal masses. Neither chemistry nor physics can ever throw the least light upon the nativity of these masses, for they are invariably the progeny or offsprings of similar parent masses or elements. *Omnis cellula à cellulæ.*

If, by means of the microscope, we make a true or anatomical analysis of the grown tissues, we discern that, in their compound or diverse forms in tissue, they consist of the more or less intimate conjunction, and in some situations the coalition, of these elements. Proceeding from within these microscopic masses, all the essential changes in the formation of tissues take place. They are the builders and building material of the tissues. They do not disappear in the various changes of tissue formation, but remain to constitute at minute intervals in every part of the body a great portion of certain tissues.

The microscope reveals to sense, that each of these little masses is irregularly spherical, ovate, or stellate in form, and often exhibits embedded in its substance one or more smaller roundish masses called nuclei. In many cases within the nuclei are still smaller masses (nucleoli), and sometimes within these yet smaller masses may be seen

by very high magnifying power. All of these germinal masses were once and still are called "cells." "Cells" are still considered to be minute bodies, invariably consisting of certain essential definite and constant parts, named cell "wall," cell "contents," cell "nucleus," and cell "nucleolus," to each of which a special office has been assigned, and to each of which in turn the power has been attributed of actuating growth in the formation of tissues.

But, in reality, at first in the growth of every organism there are no such three parts constituents of a cell at all. There are simply collections of small masses of germinal matter, the middle parts or "nuclei" of which are bounded by a little other soft-solid matter. The sum of these latter is much greater in size than the parent mass. During the increase of numbers, there is also an increase in size, the whole have undergone together. The process, therefore, is not one of mere division, but of growth; each fraction, into which the parent mass or masses is dividing, grows. If there was only simple division without enlarging, there would simply result a plurality together identical in size to the mass before division. But while dividing there is a process of growth, so that each part becomes the equal in size of the parent or dividing mass. But this process varies between wide extremes. Sometimes the growth is so limited, while division proceeds, that the several masses are scarcely greater in size than the parent mass. In other cases, their aggregate greatly exceeds in size that of the parent mass. This variation depends on varying conditions and substances surrounding the masses. At an early period of growth, therefore, the tissues consist of germinal masses unseparated from each other by either an inclosing membrane or cell wall. Hence in the formation of tissues by extension, elongation, changes of shape, or increase of number, all alike are due, *not* to a "growing in of a cell wall," but entirely to physiological changes in the germinal masses.

In all cases of tissue formation these germinal masses divide without the intervention of a cell wall.

The organs themselves, of whatever function, are simply the adjustment and arrangement and the gross outward shape of an enormous number of these elements—so many of them, in a certain shape, being in fact what is called an organ.

New or other masses of precisely similar character are produced by the division and multiplication of those existing before. Hence all the changes which are to succeed, commence by division or partition of the parent masses. From one or several of these germinal masses, numerous other masses form.

Not unfrequently these masses are without nuclei as well as cell wall, when the former subsequently appear, if the mass becomes bathed by nutrient material; and so also, sometimes, there being no cell wall, several

small nuclei make their appearance at once in various parts of the germinal mass. The nuclei and nucleolus, therefore, are not composed of *special* matter. They in reality simply mark the changes in the germinal masses in which they appear.

Everywhere intervening between these elements, wherever in the growing or grown form of tissue they are not in such contact as to exclude any form of septum, is another form of substance, known as intercellular substance. This presents various aspects, depending upon the degree and age of the formative processes which have taken place in the tissue. This substance, as the process of construction advances, undergoes remarkable changes. These changes are not due to any vital *formative* process in it, as in the tissue-building masses, for it is developed between them, and undergoes its changes, *pari passu*, with their growth and transformation. In some situations it remains in its earliest grade, semi-fluid, soft, and jelly-like. As growth proceeds, it condenses and undergoes a kind of splitting up or fibrillization, and then seems to consist of a great number of fibres, each of which had its own genesis. As it solidifies and diminishes in quantity, or, in some situations, even before the fibrillization, parts of it separate in the form of a solid network. When fully fibrillated it presents to the eye, under the microscope, the *appearance* of a bundle of very fine fibres, and wherever it is then situated is called *white fibrous tissue.* This amorphous intercellular substance becomes; in its latest form, the lowest kind of tissue. This white fibrous tissue is found investing organs, forming the dense or tendinous ends of muscles, and in other parts of the organs and structures, which require support for their less resisting elements, or where the latter may be subjected to tension, as in the play of limbs and of organs one upon another. The various ligaments are formed mainly of it.

(To be continued.)

PROFESSIONAL ETCHINGS.

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THE American traveler, on arriving at Alexandria, Egypt, is strongly impressed with the fact that he is in a foreign land. Strange sights meet his eyes, and strange sounds salute his ears on all sides. He is transferred from the steamer to a small lighter, and on landing, soon finds himself in charge of a custom-house official of Ethiopian extraction, clothed with the badge of authority; and as he examines your baggage he does not fail to impress you that he fully appreciates the responsibility and dignity of his position. On the way to your hotel your ob-

servations will be apt to lead you to the conclusion that the population consists of a more mixed and diversified character than any other city upon the face of the globe. You see all shades of color, from the jet-black Nubian to the delicate white complexion of the Caucasian; and all grades of civilization, too, from the wild Arab of the African desert to the refined European. You may see in this Oriental city representatives from nearly all the nations and tribes of the earth. It would be a capital place for the ethnologist to prosecute the study of his favorite science, invested, as it would be, with all the interest and advantage to be derived from having the living specimens constantly before him.

Here could be seen the Abyssinian with his incisor teeth of both jaws filed to sharp points, and representatives from other tribes in the interior of Africa with their teeth filed in a similar manner, in order to give a more savage aspect to the countenance, or to give additional beauty of expression. The African explorer, Paul B. Du Chaillu, states that the same style of filing the front teeth existed among some of the tribes he visited in Equatorial Africa, and that no female was entitled to be considered a belle without this peculiarity of the dental organs. The operation consists in removing the proximal angles of the cutting edges without exposing the pulp of the tooth. Although the operation must of necessity be performed with rude instruments and without much skill, yet an examination of the teeth of several persons in advanced age showed that they were perfectly sound; thus proving most conclusively that the filing of the teeth does not necessarily cause them to decay. I was reminded of the fact that it was in this city *Aetius* resided, who lived in the fifth century, and whose writings on medicine, surgery, and *dentistry* fill some sixteen volumes, who gave perhaps the earliest correct anatomical description of the teeth, as it relates to their being supplied with nerves from the *trifacial*, and also recommends the filling of decayed teeth with resinous substances, such as wax and galbanum. He was also the first, so far as is known, to advocate the use of the file in dental operations. His advice to file the teeth freely to remedy their irregularity was, however, founded in error, and would not meet with much favor among educated and skillful dentists of modern times.

Alexandria was founded B.C. 323, by the great conqueror from whom it took its name. After he had conquered Syria, advanced into Egypt, taken Memphis, the capital, and made himself master of the entire country, he started on a visit to the celebrated Temple of Jupiter Ammon in the African desert. As he pursued his way along the coast westward from Canopus, he was struck with the peculiar advantages for a great seaport and city, offered in the small town of Racotis, opposite to the Isle of Pharos. This was the spot, according to tradition, where the fabulous Proteus—the prophet and sea-god of Virgil—had his abode. Homer speaks of this spot as a watering-place in the time of the Trojan

war, and from a very remote period its harbor had afforded refuge to the Greek navigators who dared the perils of the capricious Mediterranean. Alexander, on examining the spot in connection with its natural harbor, decided to make it the site of a great naval station. The plan of the city was drawn, and Dinocrates, an architect of great celebrity, was ordered to build what afterward rose to be the great emporium of the East.

Notwithstanding Alexander's insatiable ambition for conquest, and his unexampled success in military achievements, he was not forgetful of the interests of education. While he was the pupil of Aristotle, he received his instructions with becoming deference and evident pleasure, and he assisted his preceptor with his money to complete his great work on Natural History. Although the conqueror of the world, he was the patron of learning. The founder of mighty cities and empires, he was the true friend of education, and the organizer of schools of philosophy and science. He seems to have been ambitious that the city which he had built and called by his own name should become the seat of learning, the centre of art and science. In accordance with his design, he gathered from Greece, Egypt, and the East, the most distinguished professors, and men of profound scholastic attainments. In the progress of time, Alexandria took a pre-eminent position in letters and literature, and pupils from every part of the then known world gathered to drink at her fountains of philosophy and science. Egyptians, Jews, and Arabs, as well as Greeks and Romans, here quaffed the waters from the Pierian Springs. After the death of Alexander, one of his great captains, who was the first in the line of kings, instituted the Academy called the Museum, with which was connected a society of learned men who devoted themselves to the study of the sciences. He also established the famous Alexandrian Library, which increased until it became one of the great attractions of the city. It contained some 700,000 volumes. Who can tell what valuable contributions some of these volumes would have proved to dental as well as medical science! What an insight some of these lost works might have given us into the early history and ancient practice of dental surgery! The renown of the ancient Egyptian College at Heliopolis, which had been the resort of the sages of ancient Greece, was transferred to Alexandria, and the Greek capital of Egypt became the repository of the learning and wisdom of the Egyptians; and the names of Euclid, Hipparchus, Clement, Origen, Theon and his daughter Hypatia, and others of equal distinction, shed their glory upon the literary reputation of Alexandria. With such advantages, is it any wonder that the institutions of this city gained a world-wide renown, and have exerted such an influence on mankind? Nearly all the ancient literature we possess has come down to us through the schools of this city; and the legacy would have been

of inestimably more value but for the destruction of the greater part of the extensive library. A large part of it was destroyed by fire at the time Julius Cæsar waged war against the Alexandrians. Again it suffered greatly during the revolutions that occurred in the Roman empire. The final work of destruction took place in A.D. 642, by the Saracens. Amrou, the commander of the army of Omar, was disposed to spare the library, and wrote to the Caliph to obtain his consent to do so. But the bigoted Mohammedan wrote back his well-known reply: "If these writings of the Greeks agree with the Koran, or book of God, they are useless, and need not be preserved; if they disagree, they are pernicious, and ought to be destroyed." The sentence of destruction was executed, and the thousands of volumes were distributed among the 4000 baths of the city, and served as precious fuel for six months before they were all consumed. Alexandria was distinguished especially for its medical schools. Here lived and labored Herodotus, Galen, Aetius, and many others of note in the early annals of medical science. The works of Aetius and other medical authors were consigned to the flames. From what has been preserved, we learn that the Egyptians cultivated the science of medicine at an early date—that each physician applied himself to some one specialty. Some made the treatment of the dental organs their special branch of study; and although we are unable from the records that have come down to us to obtain a clear and satisfactory knowledge of the exact condition of dental science at that early period, we have no difficulty in tracing our profession back to the days of the Egyptians through the medium of historical records, as well as from the existing evidences and specimens of dental art discovered every now and then in connection with the mummified bodies taken from the tombs and catacombs of Egypt. The writer had no opportunity of making personal researches in this direction. But he has met with several gentlemen, whose veracity he could not question, who stated that they had not only seen artificial teeth, but even gold fillings in teeth found in the sarcophagi of the ancient Egyptians. It will be remembered that the Egyptians attached great value to the dental organs, and one of their most severe punishments consisted in having one of the front teeth extracted. It would be natural to suppose that in order to avoid the suspicion of guilt, as well as to remove the deformity, artificial teeth were invented and substituted for the lost ones. Bone and wooden teeth were discovered by Belzora and others in some of the Egyptian tombs; and whatever may have been the wisdom and skill of the Egyptians, we have no indications that would lead us to conclude that the artificial teeth manufactured and used by the Egyptian dentists were in any respect comparable to the highly artistic and beautiful productions of the present day; and I may truly add, especially those of American manufacture, which have recently triumphed over universal competition.

The teeth of the modern Egyptians I found to be finely developed, and generally free from caries. But little dentistry is therefore required by the native population. Alexandria, however, as well as Cairo, has a large European population; and I learned that there were four or five dentists in the two cities who enjoyed a lucrative practice.

IGNORANCE AND WANT OF SKILL IN THE USE OF ANÆSTHETICS.

BY A. W. S.

No amount of scientific stoicism will ever be able to convince an intelligent public of the paramount injury of anæsthetics, or succeed in persuading to their disuse. Experience has demonstrated their value in surgery, in spite of the mistakes from ignorance and blundering which have so often threatened them.

Ether and nitrous oxide, for safety, undoubtedly take the lead in this country. Rightly prepared and skillfully administered, both may be regarded as safe. Accidents have occurred, however, and will no doubt continue to occur from their use; such is the misfortune incident to every valuable assuager of human suffering. Lack of judgment and experience have had much to do with the failures thus far in the use of both ether and nitrous oxide. With little experience and less scientific knowledge, many who have attempted their use in surgery have signally failed. This is especially true of the use of nitrous oxide. This gas, unlike ether, is usually prepared on the premises where it is used. The results vary of course with the materials and skill of the user, and are as wide in their range as purity from corruption, success from failure.

In most cases of anæsthesia by nitrous oxide the dentist is both judge and jury, and also the party on trial. In all failures, of whatever degree, the verdict is of course for the defendant. Is the salt from which he prepares the gas impure? He has the testimony of the seller to the contrary, for who ever made or sold a bad article of nitrate of ammonia! Has a rampant heat evolved the poisonous products of nitric oxide and chlorine? This cannot be, for it was watched most of the time by a boy, or by the busy proprietor from an adjoining room. And furthermore, it was so carefully washed (!) that these intruders, if they ever started, must have been trapped on their way, and held in solution by the water before reaching the gas-holder. Is the patient well-nigh suffocated, or rendered only delirious—just sufficient to excite the imagination of torture, owing to the nervousness and bungling of the operator? His wide experience and improved inhaler are a guarantee that the fault was not his.

Thus the inherent properties of nitrous oxide, or the idiosyncrasies of the patient, are too generally made the scapegoat for surgical failure.

After considerable observation, I feel justified in saying that at least

one-third of the gas administered is unfit for respiration. True, to healthy systems and vigorous lungs, no serious results may follow the inhaling of impure gas; and yet such cannot be pronounced harmless. This, like the poison of malaria, may not develop its injury for days or weeks.

Success in the preparation and use of nitrous oxide never lies in the line of chance. Cheap and rude apparatus, or the fortuitous products of salts of doubtful purity, or ignorance and inexperience of rudimental chemistry and chemical manipulations with heat, are sure to result in failure of some form.

Too many give nitrous oxide as a necessity—for the name, and simply to retain patients who might have their extraction performed elsewhere. Such are apt to regard only the form, while care and skill are almost wholly ignored. A prominent dentist of our acquaintance purchased a valuable automatic regulating apparatus for the preparation of nitrous oxide gas; placed it in charge of an ignorant office boy, and left him for a whole year to prepare the gas for the office. Upon examination, the most valuable feature of the apparatus was found to have never been applied; the directions were unopened, and even the proprietor admitted his total ignorance of the whole process. It is needless to say that the quality of gas, when tested, gave the *lie* to the wide-spread advertisement, "Teeth Extracted without Pain by the use of *pure* Nitrous Oxide Gas."

No professions so much need skill and intelligence as those of medicine and surgery. Where health and even life itself hang on the doings of the operator, too much skill cannot be exercised. The physician who should make a reckless purchase of drugs and medicines of a grocer because they were cheap priced; or the operating surgeon in a hospital who should purchase ether and chloroform from the laboratory of a chemical novice because by so doing he could save a few cents on a pound,—such a physician, who should attempt to economize at the peril of his patients, would deserve a murderer's fate. And yet in the use of nitrous oxide by the dental profession, in the purchase of apparatus and material, a course akin to this has been in not a few instances pursued. The public expect and have a right to demand of the dental profession proper appliances and skill.

Nitrous oxide beyond all question is the most harmless anæsthetic yet devised. Observation and a most elaborate and thorough trial in our own person confirm this opinion; and yet its history reveals some serious accidents.

The chemistry of nitrous oxide, the effects of irregular and undue heat in its preparation, the importance of thorough washing with proper materials, the necessity of pure salts, the advantages to the patient of a judicious use of air at proper periods in the inhalation of the gas,—on all these and other points there is too often a woeful ignorance and a criminal stupidity.

In all other departments of dentistry, except in the use of anæsthetics, some study and practical preparation are deemed necessary; but here, in the most critical and most responsible department, tyros and bunglers dabble with full license. It is time that dental colleges attended to this; the age of professional quackery is passing away in medicine, and charlatans are taking back seats; let dental empirics, with all their trashy appliances, share a similar fate. Then, and not till then, will ether and nitrous oxide be tried on their merits, and the public be able to judge rightly.

ARSENIOUS ACID AS A DEVITALIZER OF THE DENTAL PULP.

BY J. FOSTER FLAGG, D.D.S.,

PROFESSOR OF DENTAL PATHOLOGY AND THERAPEUTICS IN PHILADELPHIA DENTAL COLLEGE.

It is now six years since I presented to the American Dental Association the results of what I then regarded as unbiased observations, extending over a like space of time, upon this subject, than which there is probably no other of more importance throughout the range of dentistry. Twelve years of experience, together with the fact that even the latest editions of "text-books" continue not only to theorize in the old strain of bygone times, but to make statements which are easily experimentally proven to be untrue, make me desirous of republishing that communication, and of reiterating doctrines which so long a test has convinced me are safe upon which to base practice.

Of course modifications in manipulation would naturally occur during a period of so many years, but the views then entertained are now substantially the same.

Year after year it gives me pleasure to state from the lecture stand that another year has only confirmed the correctness of former teachings, and every winter affords ample opportunity of practically demonstrating the truth of the positions.

Among the various agents which dentistry has selected from the pharmacopœia to aid in the alleviation of human suffering and the furtherance of its usefulness as a profession, no one, I think, will rank as more important than arsenious acid, the action and use of which form the subject-matter of this communication.

It is not my intention to present anything historical in relation to this sheet-anchor of conservative dental operating, but I cannot forego the pleasure which this opportunity affords me to again connect the name of Dr. John R. Spooner, of Montreal, with the introduction of this remedy into the practice of our specialty, feeling as I do that on all meet occasions credit and thanks should be awarded him. It is now more than thirty years since the capability of arsenious acid for destroying the vitality of the tooth pulp, without injury to the tooth substance, has been demonstrated, and yet reference to dental text-books, and con-

versation with dental practitioners, expose a diversity of opinion in regard to its use, abuse, power, and even mode of action, that seems to intimate a singular deficiency of even so much positive information as a few years of investigation would give any earnest seeker after truth. For the past twelve years I have been engaged in careful, watchful, experimental research in this direction, and I hesitated to give such results as have accrued, mainly from the fact that quite promptly the indications I obtained pointed out many received doctrines in relation to arsenical applications as fallacious; all fears as to untoward results as groundless, except as the fruit of a degree of clumsiness in manipulation and ignorance of dental science amounting to culpability; all directions as to limit of duration of application, as based upon a want of knowledge rather than that erudition which alone entitles one to the grade of teacher; and the promised satisfaction to operators and patients, oftentimes impossible of realization, as contradicted by the evidence of the senses of the former and the cries of suffering and universal dread of the operation of "extirpation" by the latter. These considerations seemed sufficient to make me hesitate in giving publicity to views that so antagonized with those apparently established; but years have not only been confirmatory but cumulative in their testimony, and I feel that it is now a duty that I should again present what I believe, trusting implicitly in the stability of the position that truth will maintain itself against all assailants, and that what are thought to be facts, and are not so, will be eventually shattered by their own worthlessness.

The mode of operation by which arsenious acid accomplishes its results is as unsettled to the mind of science now as ever it was, the theories in this matter having each enrolled as their champions gentlemen of unquestioned attainments, whose experiments, instead of clearing the pathway for followers, have cumbered it with opinions and *assertions* so diametrically antagonistic as to leave "confusion worse confounded." But not alone with these difficulties has dentistry to contend; for to us there is proposed a problem upon which from *anatomical* considerations the conflicting experiences of Leibig and Herapath, the disagreements of Wood and Stillé, shed but little light, for the pulp of a tooth has scarcely more resemblance to the human economy than it has to the "glairy albumen of eggs!" The questions then for dentists are: How does arsenious acid devitalize the pulp? What length of time is ordinarily required to effect this? What are the indications of its progress and the sign of its completion? What are its sequences? If the web of a frog's foot be placed under the microscope, and an application of dry arsenious acid be made to it, one will observe, in the course of an hour or an hour and a half, a very perceptible increase of capillary circulation; a decided "determination" of blood to the part takes place, followed in due time by that condition known as "congestion," in which complete stagnation of the corpuscles announces that unless relief is afforded, a

true inflammatory condition will supervene; at the expiration of from four to six hours, the intense redness, the swelling of the parts, and the manifest indications of pain, inform us of the presence of that abnormal state which must terminate in one of two ways, viz.: restoration to health by "resolution," or suppuration and death of the part; at this juncture, if the arsenious acid be removed, and antiphlogistic treatment be resorted to in the shape of cold applications and rest, the parts will return to a normal condition and the health of the animal will be, for months after, to all appearances unimpaired. Arsenious acid is therefore at least a vital irritant, and as such affects the circulation; and it is further proven that up to this stage of diseased action no combination which ultimately causes "molecular death" takes place, any more than follows the exhibition of other vital irritants, such as cantharides, mustard, etc. Arsenious acid, however, is a very powerful irritant when the opportunity for its exhibition through the medium of the circulation is afforded.

(To be continued.)

IGNITION OF MATCHES FROM THE SUN'S RAYS.

BY E. M. MORRISON, NOBLESVILLE, INDIANA.

I HAD a small fire in my office, from the ignition of D. M. Richardson's parlor matches by the solar rays through a sky-light. The matches were in a small paper box on my work table, about twelve feet from the glass, which is common window glass. Fortunately I was present, and a little water extinguished the flames. I deem the fact worth relating as a caution to others.

PROCEEDINGS OF DENTAL SOCIETIES.

ODONTOGRAPHIC SOCIETY OF PENNSYLVANIA.

BY THOS. C. STELLWAGEN, M.D., D.D.S.

A MEETING was held on Tuesday evening, June 2d. At a few minutes past eight o'clock, the President, Prof. McQuillen, introduced the lecturer of the evening, F. V. Hayden, M.D., Prof. of Geology in the University of Pennsylvania, and honorary member of the Society.

This gentleman, after a few introductory remarks, announced as his subject for the evening,

"THE EXTINCT MAMMALS OF THE WEST;"

in which he alluded to the dentist and geologist as both being engaged in reconstruction: the one of the teeth, the other of the past ages and periods of the earth's many phases, together with the animals and plants that lived upon it during these mighty millions of years of time, which only can be computed by the arithmetic of heaven.

In the following quotation, he depicted the joy of creating, "that he who calls that which is lost back again into being, enjoys a bliss like that of creating." And here he associated the workers in the two sciences as alike feeling this pleasure.

The region of which he proposed to speak was that occupied at one time by the ancient lakes of the tertiary period, one of the past or last phases of the earth. He stated that depressions and elevations were always side by side upon the earth's surface, and Dana has laid down the rule that opposite the loftiest mountains we find the deepest oceans —as an instance citing the Rocky and Appalachian chains—the depression of one portion of the surface of a sphere causing another to be elevated. By the science of geology, the periods at which these vast changes have occurred are determined—the Appalachian range being elevated about the coal period; while the Rocky Mountains were possibly millions of years later in time, although much greater in height and extent; they were raised at the close of the cretaceous period, during which the Pacific Ocean had rolled over the bed from which these great mountains afterward arose. This mighty power was shown by a slow, regular, continued upward movement, and as these changes occurred, a thousand years may have been but as a minute in time. Hence geologists cannot compute by time but by periods.

The great cuts made by the building of the Pacific Railroad, and the surveys for it, show the different layers of earth that have followed one another, and also the height above the ocean level of different places upon the route through this interesting country—being at Council Bluffs some nine hundred or a thousand feet; then the gradual rise from sixteen to eighteen feet per mile, to as high as seventy to eighty feet per mile. These elevations are in series of mountains above mountains, showing that the formation was by a series of these movements. The hard granite centres or nuclei of these mountains finally burst through the top and cause that serrated appearance that gives the name of Sierras; these rocky summits are the basaltic or igneous rocks, and the slopes around and below them are composed of softer and more pliable materials. The action of water upon these has cut them down, and often peeled them off as the layers of an onion; and it is by these great natural means that the layers, having been first pushed up, are cut off and their edges exposed to the student.

At the close of the cretaceous and dawn of the tertiary periods, these vast lakes are found; and here it is that the law of nature, which traverses all, shows the unfolding of the plan in all its beauties and glories.

In these regions we find thousands of square miles of land without any timber or fuel upon it; but lignite or condensed dried wood may be found in layers beneath the surface, varying in thickness from five to twenty feet, and in extent from ten to twenty thousand square miles.

Where the Pacific Railroad is to cross the Rocky Mountains, there

was a great lake, which, from the organic remains, as oyster shells found in its bed, must have been filled with brackish water. As we pass higher up in the bed, it shows that the character of the water must have changed, for the appearance of fresh-water fish and land animals would indicate that the connection with the salt sea was cut off, as only the fresh water that drained from the mountain sides could be the element for such animals—the specimens of which are found.

Great forests must have abounded on the shores of these lakes, for we find the remains of vegetable luxuriance such as only exists in our Southern States or Brazil.

Now, above these deposits we find an arid plain almost destitute of vegetable life, with not one square mile of woodland to a hundred square miles of prairie. Where this soil has been cracked by pressure or cut down by streams, we often find beneath the stumps of what were once great trees, transverse sections of which show the rings as naturally as a freshly-felled tree; again, in others we find hollows of decay, such as when a boy he had often looked into for game. This great region is some six or seven times the size of Pennsylvania in area.

On the Niobrara River, north of the Platte, and on White River, there was another great fresh-water lake, one hundred thousand square miles of which has been surveyed, and which must at one time have been at least four times the area of this State.

Mountains are the sources of streams, and if it were not for them and the lakes or seas, the whole land would be but a foul marsh, in whose putrid depths the fatal miasmas form.

In this locality already one hundred and twenty extinct species of fossil plants have been found, among which are gigantic palms with leaves twelve feet long. Roaming through these vast forests and dense thickets, or wallowing in the marsh along the shores of these lakes, were the animals of whom I am going to speak to-night; the whole remains showing clearly that at one time here the heat was as that of the torrid zone, and the habits of the animals much as we find them in that region at the present day.

The washing of streams and the cracking of the earth's surface in the mighty upheavals that have occurred here have caused the deep fissures or cañons that abound and stretch for many miles in extent, at the bottom of which, from one hundred to sixteen hundred feet below the level, where the light of day is almost shut out, are found labyrinthine turns and sombre shade which have oftentimes so bewildered the explorer, be he Indian or pale-face, that, losing his way, he has perished in despair.

To heighten the scenery around when on the plane of the valleys, the surrounding mountains seem to rise like the domes and spires of some gigantic city that had fallen into ruins. When last I viewed this

scenery, the ruddy rays of a setting sun added their sparkling effect to the scene, and seemed to light up great windows and battlements.

It is amid such scenery as this that we seek and find the specimens which, being so thoroughly imbedded and rock-bound, can only be laid bare by the slow and sure hand of time.

A group of animals peculiar to any country constitutes a fauna; two of such are found here—one on the White River, on the lower beds or portions, and the other on the Niobrara River and Loup Fork of the Platte River. Here have been two separate phases of the earth's existence; the animals of the one living at one period of time gradually becoming extinct as the later class of animals came into existence. In their growth and the dependence of one period upon another, a law can be clearly traced, like a thread of gold running through the whole. Here are found animals of the so-called prophetic types differing slightly from those around them, and seeming to point out a change which, in the next period, we find as it were fully completed. These vast lakes, like our great Lake Superior, could not have burst at once into existence, but were slowly and regularly formed—commencing as a nucleus in the north and gradually extending southward to the Arkansas River. Just as the world or a flower must have first started from a nucleus or bud, and gradually opened and unfolded; so with the animals, they seem to have kept pace with the period, and the organic has changed as the inorganic became adapted by these alterations to the sustenance of a different species.

During these periods a large number of singular animals have flourished here, as it were, in your very vicinity, or rather so made by the great Pacific Railroad, which, with its tributaries, offers to you the means of reaching, after a few days' journey, this spot so replete with beauty and interest on the page of geological history.

In the lower beds we find the fossil remains of the Pachydermata, of which we classify first the Carnivora. All of these fauna possessed this carnivorous type, which existed upon the herbivorous animals. Here we find four species of wolves:

Canis sævus, C. temeraria, C. vafer, and *C. Hayden*. 1. Not as large as the remains of a wolf—discovered in association with those of the megalonyx, lapirus, equus, etc., on the banks of the Ohio River, Indiana, called by Prof. Leidy, *C. dirus*. It is about the size of the recent C. occidentalis. 2. About the size of common red fox. 3. Still smaller size, though the teeth do not differ in form from those of the red fox. 4. A huge fellow, larger than any living wolf, with jaws of unusual robustness.

Amphyeyon vetus. A sort of wolf or dog-like animal, about the size of a red fox. Habits like those of a wolf.

A. gracilis. About the size of a domestic cat.

Hyænodon horridus belong to a peculiar family which possess the

characters of cats, hyenas, wolves, and even bear some resemblance to the carnivorous marsupials, as opossum, probably more bloodthirsty than the wolves. The cats, wolves, and hyenas are remarkable for possession of a lone tooth in each jaw on each side, called the sectional or carnassial tooth, flesh cutting. They are the longest of the teeth except the canines, and pass each other like the blades of scissors. But the hyænodon shows its pre-eminently bloodthirsty character by possessing three of these teeth in each jaw. There are three species in Nebraska. The longest about the size of black bear (*N. horridus*), smallest about the size of a red fox, and the other intermediate in size. A number of species of this same genus were found in formations of the same age in the south of France.

Pseudælurus insterfielus. A cat about the size of the common panther (*Felis concolor*), with all the habits of cats.

Drepanodon (*Machairodus*) *primævus.* An animal about the size of our panther, Felis concolor, with the upper canines proportionately much longer and more developed than in the recent genus *Felis*, while the lower canines were less developed. The upper canines were compressed laterally, and resemble a sabre in form, and hence the name given to the animal of sabre-toothed tiger. Judging from the structure of the animal, it had the habits of the cat, but is supposed to be more fierce and bloodthirsty, and a great enemy of the oreodon, with which it was a cotemporary. The above cat is probably the most ancient known.

D. occidentalis. About a fourth larger than D. primævus, with the same habits.

Deinictis felina. Partook of the character in its teeth of an animal intermediate between the cats and the weasels. It had the same number of teeth as the weasels, but the corresponding teeth were like those of machairodus, even to the sabre-like upper canines. It was about the size of a panther, a fierce, bloodthirsty fellow, as much so as any of the family of the cats.

Aelurodon ferox. The teeth indicate an animal about the size of the common wolf of this country or Europe, and was undoubtedly a huge cat.

Leplarctus primus. An animal about the size and with the habits of a raccoon.

Ruminantia.—*Oreodon Culbertsoni, O. gracilis, and O. major.* Ruminating hogs, really pachydermatic, remarkable among ruminants for possessing front teeth in both jaws, while all our modern ruminating animals have no front teeth in the upper jaw. It had strong canines in both jaws, like the hogs and peccaries, but the back molars departed from the character of the hogs and peccaries in being constructed after the same pattern as the modern ruminants, as the deer and ox, and they further differed from modern ruminants in being four-toed, like

the hogs. The O. Culbertsoni were about the size of a common peccary. The great abundance of the remains of these animals indicate that they lived in herds like our modern peccaries or buffalo. O. major, about the size of a large hog.

Merychœrus proprius was a ruminating hog, about the size of a large boar.

Merychius—major, medius, elegans. Three animals, very much like the oreodons, except that they still more approached the modern ruminants, through the sheep, and were probably the descendants of the oreodons, and replaced them in the miocene, or rather near the pliocene representatives of the miocene. The three species corresponded in size to the three species of the oreodon.

Leptauchenia—major, decora, and nitida. Three species of this genus, allied to the camels, differing mostly in the character of dentition and structure of skull. L. major was about two-thirds the size of a sheep, the L. decora about half the size, and the L. nitida about the size of a rabbit. They belong to a peculiar family, intermediate between the oreodons and the camels. They have the full dentition of the oreodons. While the back molars of the oreodons resemble those of the deer, those of the *Leptauchenia* resemble those of the camel. The skull of *Leptauchenia* is remarkable for large vacant spaces in front of the forehead, extending upon the sides of the face; and traces of the same are observed in the lama Merychius and Leptauchenia; were probably both gregarious, like the peccary and bison.

Agrichærus—antiquus, major and minor. Three animals. This animal was more like a hog than the oreodon, was omnivorous, chewed his cud, ate carrion as well as vegetables; about the size of a common A. major; perhaps a fourth larger.

Probrotherium Wilsoni. An animal approaching the camel family, and Prof. Leidy has placed it in the family of the Camelidæ. It is about the size of a sheep, chewed its cud, approached nearest in character the lama among recent animals—a purely vegetable eater.

Procamelus—Robustus, Occidentalis, and *Gracilis.* 1st, about the size of the common Bactrian camel of modern times. Differs from the modern camels in the possession of a greater number of teeth in the jaws. 2d, about the size of the lama. 3d, about the size of a sheep. Habits of all the extinct camels, about the same as those of our recent ones.

Homo camelus caninus. About the size of the lama, but does not differ much from the other camels except in the structure of the teeth.

Protomeryx Halli was the size of the common collared peccary. This western region seemed to be remarkable for the number of hogs and camels.

Megalomeryx Nebrahensis was a ruminating animal of the largest size. The teeth resemble very closely those of the sheep.

Merycodus necatus was a camel-like animal, about as large as a sheep.

Leptomeryx Evansii. Like a musk deer, about the size of the one from which the officinal musk is taken, *Moschus moschiferus.* It was probably an ancient musk deer, and corresponded in size, structure, and habits with our living musk deer.

Cerus Warreni. A third smaller than the common Virginia deer.

Antelope. There was also a small antelope in this fauna (pliocene), peculiar in having a furcate or forked horn like the prairie antelope; was a smaller animal, about the size of C. Warreni.

Pachydermata Artiodactyla.

Elotherium (Entolodon) Mortoni was an equal-toed hog, about two-thirds the size of an ox, while the E. ingens was about the same size as an ox. They were true hogs, with powerful canine teeth like a bear, and probably like a bear in the nature of their food.

Perchœrus probus. An honest pig, with all the habits and characters of a pig, about the size of a small peccary.

Leptochœrus spectabilis was a hog not much larger than a cat.

Dicotyles (?) The upper canine teeth of a peccary, as large as the South American animal, found on the Niobrara.

Pachidermata Perrissodactyla.

Hyopotamus Americanus is an eocene animal in Europe, first found in the Isle of Wight, first described by Prof. Owen as *H. bovinus.* Our species was about the same size—about the size of a small ox. The teeth of the American species are almost identical with H. bovinus (Owen), and intermediate between the ruminants and the rhinoceros family. The habits of the animal were much like those of the rhinoceros; but from the structure of the teeth, it is not improbable that the animal may have ruminated.

Rhinocerous Occidentalis. A hornless fellow, about the size of an ox; habits like those of the modern animals; about half the size of R. Indicus, and therefore the smallest species known.

R. Crassus was about the size of the animal of India, and probably possessed a horn. This is suspected from its horn resemblance to the existing animal. It seems to have had about the same size and formula of dentition with the recent animal.

Hyracodon Nebrascensis. A small, hornless rhinoceros, about the size of a small hog, differing from all other known rhinoceros, extinct or recent, in possessing a full series of front teeth (incisors) in both jaws; a harmless, pig-like animal, inhabiting the marshes along the borders of the great lake, in the sediments of which the remains were preserved.

Titanotherium Prouti was a huge rhinoceros-like animal, nearly as large as an elephant; habits probably similar to those of a rhinoceros.

Lophiodon occidentalis. A tapir, about the size of the common

American animal, and probably had the same habits—an eocene genus in Europe.

Mastodon mirificus. Like an ordinary mastodon in habits; perhaps a little smaller; differs in the teeth having a greater number of lobes or divisions. This is a much smaller animal than the *M. Ohioticus.* The form of the jaw is like that of the existing elephant of India.

Elephas imperator. Does not differ materially from the existing elephant except in its greater size, being about a third larger than any ever before known, extinct or recent.

Solidungula.

Equus excelsus. About the size of our common horse.

Protohippus perditus. A small horse, about the size of an ass. The enamel folds on the triturating surfaces are even less complex than in those of the recent horse.

Protohippus placidus.

Hipparion occidentale. About the size of an ass.

Hipparion speciosum. Smaller than an ass.

Hipparion affine.

Hipparion gratum.

Merychippus insignis. Remarkable for the teeth being intermediate between those of the common horse and ruminants in their construction. It was about the size of an ass.

Merychippus miriabilis.

Anchitherium Bairdii was a three-toed horse, about the size of a sheep. The grinding teeth of the genus differ from those of modern horses in being inserted into the jaw by distinct roots, whereas in true horses the crowns of the teeth form long columns, which are gradually protruded as they are worn away. While they were both herbivorous, the teeth indicate that it was less graminivorous than the horse, or, at least, its food was of a more succulent nature. If the Anchitherium ate grains, its teeth would soon be worn away. It is a remarkable fact that this genus is much like Paleotherium in the structure of the teeth, but like the horse in skeleton.

Hypohippus affinis. Allied to the last, and about the size of the ass.

Parahippus cognatus. Approaches *Anchitherium;* is intermediate in size between the ass and sheep.

Paleolagus Haydeni. A rabbit about the size of the little Lepus Virginianas.

Ischyromys typus.

Paleo castor (steneofiber) Nebrascensis. A small beaver, about half the size of the living beaver, and about like the recent one in its habits.

Castor tortus. A small beaver, intermediate in size between the *P. Nebrascensis* and the recent animal.

Eumys elegans.

Hystrix venustus. About the same size and much like the crested porcupine of Europe (*Hysthrix cristata*).

INSECTIVORA.

Leptictis Haydeni. This is a little insectivorous animal, about the size of a hedghog, but probably had no quills.

Ictops Dakotaensis. This animal, as well as the above, was insect-eating, and about the same size.

Here were also, during these geological periods, the remains of some animals which form what has been termed prophetic types, or those which possessed characters which indicated the coming in the future of higher and more perfect forms. Thus the Hadrosaurus and Discosaurus were prophetic of the coming of the mastodons and elephants, while the Megalosaurus, Deinodon, and Lælaps foretold the appearance on the earth at a future period of the sabre-toothed tigers and the present race of cats.

The speaker closed with a somewhat fanciful speculation, which had been suggested to him by Prof. Leidy in conversation. It is a curious fact that although the teeth of the present race of men are so subject to decay, yet no animal, either living at the present time or during the almost endless periods of the geological past, has ever revealed a decayed tooth; so that in that respect man stands alone in the animal kingdom. There are skulls of animals in the collection of the Academy of Natural Sciences so old that the teeth are worn completely to the fangs, yet they remain firm in the jaws, and show no signs of decay. In the human jaw the teeth are usually entirely absent by decay, or drop out in old age, which fact would seem to indicate that in a succeeding era human beings would become edentulous or toothless; and that, instead of being omnivorous, as at present, living on meat as well as vegetable food, they would subsist on vegetables of a succulent or pulpy nature, and canned fruits, etc. It is the prevailing belief of naturalists that there have been numerous races of human beings preceding the present one, and that in the great future there will be a succession of races as far superior to the present one as this is superior to the primitive races, when the intellectual and the spiritual will entirely predominate over the animal nature, holding it in complete subjection. If this should prove to be the toothless age to which we have referred, it is plain that, however laudable and philanthropic the dental profession may be now, it will then have passed away from the earth forever.

Prof. McQuillen, at the conclusion of the lecture, said that the remark made by Prof. Hayden relative to the dentist being a *reconstructionist*, is literally true, whether he be engaged in building a gold crown upon the root of a decayed tooth, or in the construction of artificial dentures to supply the place of the natural organs. In addition to this, those who have the knowledge and are willing to give the time can

aid materially in the *reconstruction* of the geological history of the world. This must be evident to every one present, in observing the important part the teeth occupied in the instructive discourse with which they had been favored descriptive of species that lived on this earth for a brief period and then passed away forever.

Broad generalizations in science can only have a secure foundation in a multitude of facts carefully observed and recorded by reliable and patient investigators. It is granted to the few only to enjoy the privilege of discovering and enunciating the great laws of nature; but every one, however limited his opportunities, may by patient observation discover some new fact which shall prove an important link in the vast chain of evidence upon which a master-mind rears an imposing and enduring superstructure. One fact added to science, let it be ever so insignificant, is worth more than a thousand fanciful speculations which have no foundation other than in the imagination of mere dreamers, who clothe their shallow ideas in the most absurd and incomprehensible language, and who, when speaking upon such subjects, make up in sound what they lack in sense. In illustration of the importance of carefully observed facts, an instance was cited in which an important case, involving large pecuniary interests, was decided by the microscopical examination of a tooth supposed to be that of a saurian reptile, but which proved to belong to a species of extinct fishes. Regretting that he had no fossil teeth to show to those present, the speaker then exhibited, under the microscope, longitudinal and transverse sections of the poison fangs of a rattlesnake, which he had recently prepared from the head of a rattlesnake which had been given to him a short time before by Dr. S. Weir Mitchell, who has devoted considerable attention to the habits of that animal. The longitudinal section was made the more interesting by a natural injection of the pulp cavity at the lower or apicial third of the fang. In connection with the exhibition of these specimens, a general description was given of the peculiar structure of the dental organs of reptiles, and particularly the poison fangs.*

After the transaction of some business matters connected with the Society, it adjourned to meet on the first Tuesday in September.

ILLINOIS DENTAL ASSOCIATION.

The Illinois State Dental Association met at the Senate Chamber, in Springfield, Illinois, on Tuesday, May 13th, 1868.

At 11 o'clock A.M., the meeting was called to order by Dr. G. H. Cushing, President of the Association, Dr. M. S. Dean acting as Secretary. The Association continued in session three days.

* A communication on this subject will be presented in the next number of the magazine.

The following named gentlemen were elected members of the society: T. D. Laughlin, G. S. Miles, G. V. Black, Charles Henry, G. W. Rivers, C. O. Dean, F. E. Hanson, N. C. Hunting, C. S. Smith, C. K. Sawyer, M. Hurt, and S. L. Edwards.

On motion, Drs. H. J. McKellops and Poor, of St. Louis, were elected honorary members.

An election for officers during the ensuing year resulted as follows: President, E. H. Kilbourne; Vice-President, G. P. Kingsley; Secretary, H. J. Smith; Treasurer, A. W. French; Librarian, M. S. Dean; Executive Committee, H. N. Lewis, C. W. Rivers, O. C. Dean, J. N. Crouse, and G. V. Black.

Dr. E. H. Kilbourne was introduced by the retiring president, and on taking the chair thanked the Society for the honor conferred upon him and assured them that the interests of the Society should receive his consideration and influence.

In the course of the meeting he read a paper on the importance of preserving "First Permanent Molars."*

Dr. M. S. Dean, of Chicago, read a paper on "Plugging Pulp Cavities," of which the following is a brief synopsis:

He commenced by saying that the nerves of the roots were supposed to be devitalized, and the roots and surrounding parts in a healthy condition before the subject under consideration came to his special notice. That this narrowed down the subject to the operation of preparing and filling these nerve cavities. He considered this a simple operation, when proper care was taken in preparing the cavities, as a rule. He described his mode of filling rather minutely, and condemned cotton, Hill's stopping, tin, and wood. They were all destructible materials, and penetrable by the fluids and gases. Cotton, if saturated with creasote, would answer very well until the creasote had become dissipated, which it would certainly do sooner or later, and other fluids would certainly take its place—to decompose and generate gases destructive to the surrounding parts. Hill's stopping was a non-conductor, but he considered this of no practical importance. Should it be desired by any, it might be used after the foramen had been sealed with gold, and in this place, if used simply as a non-conductor, after filling the apicial portion, he would prefer well-fitted corks. The pressure of the filling directly upon it would produce corresponding lateral pressure against the tubular walls, rendering the filling perfect. He thought that the entrance of the fluids into the canals by endosmotic force might be somewhat prevented by the creasote and tannin which have been used in their treatment, by entering the tubuli of the dentine and fixing the albuminous matter which they may contain, rendering them impermeable to either fluid or gases. His reason for preferring gold to any other ma-

* This will appear in our next number.

terial is because it is incorruptible and non-irritant—easier carried to the apicial foramen, and, if thoroughly packed, absolutely shuts out the subtlest intruder.

Dr. C. S. Smith advocated the use of cotton and creasote for filling pulp cavities, and contended that creasote forms with the animal matter of the tooth an insoluble substance, thus closing up the dentinal tubuli and rendering the canal impervious to the secretions.

Dr. Black uses gold in the form of a ribbon rolled on a broach, and forces this into the canal to the apex of the root.

Dr. Cushing cited several cases in which he extracted teeth and found gold in the form of wire protruding through the foramen, in one instance three-eighths and in another one-eighth of an inch. He uses cotton and creasote for filling canals.

Dr. Rives thought that the majority of failures in fang filling was attributable to the imperfect manner in which the operations are performed. Uses gold generally. Does not regard cotton and creasote entirely objectionable.

Dr. Judd, of St. Louis, coincided with the essayist in the main—regards the indestructibility in a material for filling fangs absolutely necessary. Gold cannot be forced through the apicial opening of a fang, unless the cementum which closes the foramen be removed by absorption.

Dr. McKellops advocated the use of gold for filling roots on account of its indestructibility; has removed teeth where the gold has become exposed by the absorption of the cementum from the apex of the fang.

Dr. Lewis asked whether a tooth in which a broach had been broken off in the foramen, if it be kept dry and filled, would oxidize.

Dr. Judd answered that the cementum at the apex of the fang is permeable by the fluids, and that there was a probability of the secretions reaching the broach and causing the oxidation.

The Chair announced the next subject for discussion to be "Receding of the Gums in Persons of Middle Age—Cause and Treatment."

Dr. Wilson read a very able and interesting paper upon this subject. A discussion then ensued upon the points referred to in the paper.

Dr. Judd thought our researches upon the subject had failed to discover a satisfactory cause of the disease. It was not known whether the gums receded by absorption, or are washed away by an acid fluid secreted by the gums and acting upon the structure; thought the use of a stiff tooth brush, with constitutional remedies, would be the proper treatment in such cases.

Dr. Dean thought the absorption, when not caused by local irritation, was the result of defective nutrition.

Under the suspension of the rules, Dr. Eames, of St. Louis, presented a most interesting case of morbid anatomy, in which the nasal, palatal, and anterior portion of the superior maxillary bones were entirely de-

stroyed by epulis; the disease was arrested and permanently cured by topical treatment.

Dr. Eames exhibited a most ingenious mechanical apparatus, which he is preparing, to restore the lost part, which promises to be a success.

Dr. Freeman offered a paper on the "Observed Effect of Premature Extraction of Temporary Teeth," in which he affirmed that the premature extraction of temporary teeth frequently produced irregularities, and sometimes, as he thought, retarded the early coming of the permanent teeth.

Dr. Forbes thought the development of the maxillæ did not depend on the presence of the teeth; that the blood-vessels which permeate the maxillæ supply the osseous material for its formation; had not observed any ill effects from premature extraction of deciduous teeth.

Dr. Cushing had not been able to discover any bad results from the premature extraction of the deciduous teeth; he never removed them unless they became a source of irritation through disease.

Dr. French regarded the presence of temporary teeth necessary for the development of the jaw.

Dr. McKellops opposed the injudicious extraction of the temporary teeth, and only resorted to the removal when the necessities of the case demanded it.

Dr. Cushing read a paper on "Facial Neuralgia," which called forth considerable discussion, in which many members joined.

"Anæsthesia" was announced by the Chair.

Dr. Cushing read a paper upon the duties of the profession in the use of anæsthetics, in which he briefly reviewed the merits of the two principal agents now in use, viz., chloroform and nitrous oxide, as to their safety and desirability, citing chiefly from Professor Watt, of Cincinnati, his experiments and deductions, and drawing from the evidence the conclusion that much greater caution was necessary in the preparation of nitrous oxide than probably was generally used; and that its preparation and administration were undertaken by a vast number of incompetent and irresponsible parties; but establishing upon such evidence as was attainable the fact of the much greater safety of nitrous oxide, as well as its preferable qualities over chloroform in many other respects, and concluding with an earnest appeal for a full investigation of the subject, in order to secure simplicity and certainty in its preparation; to establish, if possible, a standard by which it may be easily tested, and by every safeguard which can be thrown around it, to place it upon the most assured ground of safety and reliability, under the conviction that eventually it would prove to be the greatest boon to suffering humanity which a merciful Providence could vouchsafe.

Considerable discussion ensued upon the question as to the merits of the different anæsthetic agents, in which Drs. Wilson, Judd, Freeman and others participated.

Dr. C. Stoddard Smith described two cases that came under his observation, where the disease was caused by the ossification of the pulp.

Dr. Forbes asked whether the hygienic habit stimulated the deposit of ossific matter, or whether it was a morbid deposition.

Dr. Cushing thought it a morbid condition.

"Anæsthetics" was taken up, to give Dr. Wilson an opportunity to exhibit an "improved inhaler," for chloroform and other vapors and gases. He considered the easy working of the valves of the instrument as very important in the process of inhaling. The subject was then passed; after which Dr. Black offered the following resolution, which was adopted:

Resolved, That a committee of three be appointed to prepare an address to the people on the subject of the importance of the proper treatment of the "six-year molars," and that such address be presented to the next meeting of this body for their consideration.

On motion of Dr. Kingsley, Drs. Kilbourne, Black, and Cushing were appointed said committee.

The following delegates to the AMERICAN DENTAL ASSOCIATION were then elected: Drs. Charles Henry, G. S. Miles, O. Ames, C. S. Smith, F. E. Hanson, H. J. Smith, S. L. Edwards, J. D. Kilbourne, O. Wilson, A. W. Freeman, J. N. Crouse, George P. Kingsley, and G. V. Black.

"Mechanical Dentistry" was announced as next in order. Dr. Ames addressed the Association upon the subject.

Dr. Kilbourne, President of the Association, then offered a resolution in denunciation of the course of the St. Louis Dental College, which was adopted.

On motion, Dr. M. S. Dean, of Chicago, was selected to address the Association at its next annual meeting.

Dr. Miles offered a resolution thanking the Secretary of State, Hon. Sharon Tyndale, for the use of the Senate Chamber, which was unanimously adopted.

On motion, the Association adjourned to meet at Quincy on the second Tuesday in May, 1869.

ST. LOUIS DENTAL COLLEGE.

AT a meeting of the trustees of the St. Louis Dental College, held on the 23d May, the following exposition was ordered to be published, signed by the President and Secretary thereof:

EXPOSITION TO THE DENTAL PROFESSION OF THE UNITED STATES AND THE PUBLIC AT LARGE.

The trustees of the St. Louis Dental College, having borne with the falsehoods that have been promulgated by men belonging to the Missouri Dental College until "forbearance ceases to be a virtue," have determined to make the following exposition:

On the 22d day of April, 1867, the St. Louis Dental College was chartered by due course of law of the State of Missouri.

At a meeting of the Missouri State Dental Society, held in St. Louis, June 4th, 1867, the conduct of some of the trustees of the Missouri Dental College (they being in the majority) was so outrageous and ungentlemanly toward the representatives of the St. Louis Dental College, that they were compelled to withdraw from further communication with that society, and resigned. With "malice aforethought" they then made the threat that "they would soon kill the St. Louis Dental College." In a day or two after this, a committee was appointed to inquire into the difficulty, composed of Drs. Townsley of Sedalia, Brewer of Palmyra, Missouri, and Black of Jacksonville, Illinois, who, after a patient and careful investigation of all the facts, had the manhood to report that the whole difficulty had originated in and through *personal matters*, upon which they felt unable to report.

In July following, the St. Louis Dental College sent Dr. Joseph Payne, the then president, to represent the interests of the college at the meeting of the American Dental Association at Cincinnati, and when his credential was read, one Kennicott, of Chicago, who had already received his cue, proposed a committee to inquire into the validity of his certificate, and standing of the college, against all previous proceedings and laws governing that association. A committee was appointed, who, after conferring with Drs. Spalding, Judd, Morrison, Peebles, Eames, and McKellops, of the Missouri Dental College, and one or two stool-pigeons who went with them, made the following report:

REPORT ON THE ST. LOUIS DENTAL COLLEGE.

Dr. Kennicott, from the committee on the credentials of Dr. Payne, of St. Louis, made the following report:

Your committee would respectfully report that they have had the matter referred to them carefully and earnestly under advisement, and weighing carefully all evidence, *pro* and *con.*, they are forced to the conclusion that the St. Louis Dental College has no existence, except under a technicality of a loose and dangerous statute of the State of Missouri; that it has never attempted to fulfill the spirit of even this bad law, by instituting lectures, clinics, or any other mode of teaching dental science; that the degrees and diplomas which this so-called college has conferred are null and void in law, and ought to be ignored and repudiated by all regularly constituted colleges and associations; that the scheme of its birth was conceived with very discreditable motives, and that its culminating act of sending delegates to this association merits our strongest condemnation and rebuke.

And, finally, your committee believe that the recognition of this so-called dental college by this association, by accepting its delegates, would be setting a dangerous and mischievous precedent that would lower the standard of dental education, and put quacks and mountebanks in the highest places of trust and honor in the profession.

All of which your committee most respectfully beg leave to submit for the consideration of this association.

J. A. Kennicott,
A. W. French,
J. Richardson,
B. T. Spellman,
R. W. Varny,
Committee.

The only reply that is necessary to the above falsehood is that the St. Louis Dental College and the Missouri Dental College obtained their charters from the *same law* and by *precisely the same proceedings*. Further comment on this report is unnecessary.

The above slander was published throughout the United States in newspapers and dental journals, and by circulars wide-spread, of the most insulting character, through the instrumentality of the parties interested in the Missouri Dental College, who on their return to St. Louis made their boast that they had accomplished the object for which they went to Cincinnati, namely—"they had killed the St. Louis Dental College."

Still, not being satisfied with these wide-spread slanders, of which no notice had been taken, they have continued their defamations, and on the 12th of the presenth month (May, 1868), at a meeting of the Illinois State Dental Society, convened at Springfield, at which Peebles, Eames, McKellops, Spalding, and others were present, another attack was made on the St. Louis Dental College, and the above report again adopted. And now we have to say that, if dental societies prostitute their convocations into promulgating falsehoods in regard to the standing of institutions and laws of neighboring States, and constitute themselves engines of wrath in *personal matters*, it is high time the public should be apprised of the fact, and the names of these defamers emblazoned before the world.

McKellops, Spalding, Eames, Judd, and Edward Hale, Jr., of this city, had the hardihood to call upon the Dean and Professor of Surgery of the St. Louis Dental College, Dr. E. C. Franklin, and endeavor to intimidate and induce him by falsehoods and threats to resign his position.

In conclusion, the trustees of the St. Louis Dental College, in view of the injuries they have sustained by the press, as a matter of justice, respectfully request that the newspapers and dental journals throughout the United States publish this reply to the foregoing slanders.

"*Sic semper tyrannis.*"

ALEX. DIENST, D.D.S., President.

Chas. D. Ludwig, D.D.S., Secretary.

(*Missouri Democrat*).

AMERICAN DENTAL ASSOCIATION.

THE eighth session of this Association will be held in Grant's Halls, Niagara Falls, beginning on Tuesday, July 28, 1868.

The following arrangements have been made with regard to accommodations: The International Hotel will receive members of the Association at $4.00 per day—a reduction of fifty cents per day from their regular terms. The Spencer House charges $3.50 per day. By giving timely notice to the Committee of Arrangements, apartments will be reserved for members of the Association, especially those accompanied by ladies, at either of the hotels.

GEO. B. SNOW,
B. T. WHITNEY,
A. P. SOUTHWICK, } *Com. of Arrangements,* Buffalo, N. Y.

NOTICE—AMERICAN DENTAL ASSOCIATION.

THE members of the American Dental Association who have not paid their dues for 1867, or are indebted for former dues, are requested to forward the amount immediately to the undersigned, and prevent their names from appearing upon the delinquent list, to be reported at the next meeting, held at Niagara Falls in July next.

WM. H. GODDARD, *Treas. Am. Den. Ass.*, Louisville, Ky.

EDITORIAL.

BIOLOGICAL AND MICROSCOPICAL SECTION OF THE ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA.

WITHIN the past few weeks a number of gentlemen residing in Philadelphia, who have been engaged for several years past in microscopic researches, met together informally, with the view of taking into consideration the propriety of establishing a microscopical society. After a free expression of opinion, in which various plans were proposed, eventually, in accordance with the wishes of several of those interested in the movement, and who regarded microscopy as a means to an end, particularly in investigation of the laws of life, it was decided to unite with the Biological Section of the Academy of Natural Sciences (a department established about ten years ago), under the name of the Biological and Microscopical Section, and thus secure the use of the Hall, Library, Museum, and Microscopes of the Academy. Several meetings have been held at the Academy, the section reorganized, and considerable interest manifested. The officers of the section for the ensuing year are as follows: *Director*, William Pepper, M.D.; *Vice-Director*, J. Gibbons Hunt, M.D.; *Recorder*, J. K. Tyson, M.D.; *Corresponding Sec-*

retary, J. H. McQuillen, M.D.; *Conservator*, Herbert Norris, M.D; *Treasurer*, C. N. Peirce, D.D.S.

A number of excellent microscopical specimens prepared by the members have been exhibited, accompanied by interesting remarks; and from the fact that the members are engaged in various fields of investigation, and particularly interested in some special department of science—Chemistry, Botany, Anatomy, Physiology, Odontology, Pathology, Microphotography, etc.—and all desirous of having every possible improvement in the microscope and its accessories, there is every reason to believe much benefit will accrue to those who have united in this movement, and possibly the section become a medium through which important additions may be made to science. Matters of special interest to the dental profession, which may be presented at the meetings, will be published from time to time in the DENTAL COSMOS.

RESIGNATION OF PROF. ROBLEY DUNGLISON, AND ELECTION OF PROF. J. AITKEN MEIGS TO THE CHAIR OF INSTITUTES OF MEDICINE IN JEFFERSON MEDICAL COLLEGE.

PROF. ROBLEY DUNGLISON, who has been long and favorably known on both sides of the Atlantic as a voluminous medical writer and popular teacher, after a service of nearly half a century as a professor in various medical institutions,—admonished by the condition of his health, and recognizing the need of rest,—recently tendered his resignation as Professor of Institutes of Medicine in Jefferson Medical College. An Englishman by birth, Prof. Dunglison was invited in 1824 by the Trustees of the UNIVERSITY OF VIRGINIA to come to this country and fill a chair in that institution. Accepting that offer, he took an active part in the organization of the faculty, and continued his connection with it a number of years, during which he became an intimate friend of its founders, Thomas Jefferson and James Madison, and was by the bedside of the first-named distinguished statesman and philosopher when he drew his last breath. Subsequent to this, Prof. D. was invited to fill a chair in the UNIVERSITY OF MARYLAND, where he remained a short time, and then, at the reorganization of the JEFFERSON MEDICAL COLLEGE, in 1836, associated himself with Profs. Pancoast, Mütter, Meigs, Mitchell, Bache, and Huston, and inaugurated the marked success which has attended that school down to the present, contributing largely toward this by his recognized ability and labors in connection with the efforts of his able and brilliant colleagues. It may be justly said that a more efficient corps of medical teachers were never brought together in this country or in Europe. Occupying the responsible position of a teacher with an annual class of over five hundred students, and as an author, the sale of whose works has been immense, there can be no question that Prof. D. has exercised a wide and salutary influence upon the medical profession

of America. And in his retirement he carries with him the unqualified respect and affection of his colleagues and those who have sat under his teachings or perused his valuable works. May he continue to enjoy this with renewed health for many years to come.

The vacancy thus created in the FACULTY of the JEFFERSON MEDICAL COLLEGE has been most appropriately filled by the election of PROF. J. AITKEN MEIGS, an alumnus of the institution, and a gentleman whose contributions to science, particularly in Anthropology, have been duly recognized, and gained for him an enviable reputation not only in America but also in Europe,—his efforts in that direction having secured for him honorary membership with the Anthropological Societies of Paris and London, and the esteem of eminent men of science at home and abroad.

An acquaintance of twenty years with Prof. Meigs (first as fellow students, and subsequently as workers in the same field of science) has afforded the writer excellent opportunities of forming an estimate of his attainments as a man of science and capacities as an instructor.

As a student, he manifested remarkable quickness in acquiring knowledge; this, combined with persistent industry, a retentive memory, a philosophical cast of mind, and a thorough command of language, has enabled him to deliver, during the past eighteen years (first in a popular course on Physiology in the FRANKLIN INSTITUTE of Philadelphia, then as PROFESSOR of INSTITUTES OF MEDICINE in the PHILADELPHIA COLLEGE OF MEDICINE, and subsequently from the same chair in the MEDICAL DEPARTMENT OF PENNSYLVANIA COLLEGE), courses of lectures which were highly interesting and instructive to those in attendance. As a teacher, his style is remarkably clear and perspicuous, his matter orderly and methodically arranged, and his illustrations such as are best calculated to give the listener a clear apprehension of his meaning and make an indelible impression upon the mind. That he will fill this new position with advantage to the students and in a manner creditable to the institution and himself, is the conviction of those who know him best.

J. H. McQ.

BIBLIOGRAPHICAL.

HOW TO WORK WITH THE MICROSCOPE. By LIONEL S. BEALE, F.R.S. Fourth edition, containing upwards of 400 illustrations, many of which have been drawn on wood by the author. London: Harrison, Pall Mall. 1868.

We have never read a book that has afforded us more entire satisfaction than this valuable work on the Microscope. The descriptions in the text are so plain and terse, so free from circumlocution, and the numerous illustrations (many of which are colored) so perfect in their execution, that those having the most limited acquaintance with the subject cannot fail to comprehend the meaning of the writer; while per-

sons who have devoted years to microscopical investigation and are familiar with all the works on microscopy, will gain many new and important suggestions from an enthusiastic and successful laborer in this important field of science.

The work is divided into five sections. Part 1 opens with a description of the microscope, accessory apparatus and other agents required in ordinary microscopical work. Part 2, the preparation and preservation of objects for the microscope; the methods of separating deposits from fluids; of injecting and demonstrating the structure of the fully-formed tissues of man, the higher and lower animals and plants, and of examining minerals and fossils are minutely and carefully described. The portion in this section devoted to the injecting of vessels and the staining of tissues is particularly interesting, and the experience of the author in this direction having been quite extensive and successful, his suggestions are exceedingly valuable. Part 3 embraces chemical analysis applied to microscopical investigation—obtaining crystalline substances, and spectrum microscopic analysis. Part 4 contains an extended and detailed description of the taking of photographs of microscopic objects, apparatus, illumination, chemical solutions, practical manipulation, printing, photographs for the magic lantern, etc. In his opening remarks in this section the author pays the following tribute of respect to what has been done by Americans in microphotography.

"Since the last edition of this work was published in August, 1864, some valuable improvements have been introduced in the method of taking microscopical photographs, and it seems probable that before very long far greater perfection in the results will be obtained than was supposed to be possible at that time. My friend, Dr. Maddox, has continued his experimental investigations, and with continually increasing success; and many observers in Germany and France, as well as in this country, have produced beautiful photographs of various kinds of objects. But perhaps the most remarkable advances have been made in America. The authorities in the War Department, recognizing at once the high importance of photographic representation of microscopical specimens, have issued a report in which will be found the results of the researches of Brevet Lieut.-Colonel Dr. J. J. Woodward, and Brevet Major Dr. F. Curtis. This report is most admirable. The drawings are beautifully executed, the paper well adapted for them, and the printing excellent, contrasting remarkably in all these points with the rough-looking blue books issued under the authority of our government. It seems to me very hard that our statesmen do not more distinctly indicate that they fully appreciate the high importance of purely scientific investigation than has been the custom hitherto, and our government clearly ought to take a very active part in advancing new methods of inquiry, particularly in connection with naval and military medicine and surgery. In the medical department of our army and navy there are, to my knowl-

edge, scientific men as able and as willing to devote themselves to scientific work as any in the world, but they have no opportunity, and little or no encouragement seems to be afforded by the high military authorities. I append an extract from p. 149, Circular No. 6, Nov. 1865, War Department, Surgeon General's Office, Washington, and hope that it may perchance be brought under the notice of some of those who alone have power to forward or obstruct scientific progress in the departments under government control."

In connection with this paragraph, Dr. Beale adds in a footnote: "I believe that it would be most difficult, if not actually impossible, for our government at this time to issue a report of the character of that from which the extract is taken, supposing that the actual work had been done by private persons and placed at the disposal of the State. The paper of our blue books is too coarse, and the printing too rough for scientific members. Let the reader, for instance, compare the plates accompanying my report on the Cattle Plague, which were printed by government, with those in the present work. The contrast between the text of government and private works is still more striking."

Those who have had an opportunity of examining the arrangements in the Army Medical Museum for taking microphotographs, and the admirable results obtained by the gentlemen named, will recognize the justice of the tribute paid to them, which comes with peculiar force and grace from one whose labors command the unqualified respect of the scientific world.

Part 5 is devoted to a description of the highest magnifying powers yet made, and the best methods of using them. New modes of preparing specimens for examination with the highest powers. New views concerning the structure, growth, and nutrition of tissues, and on life.

Regretting that limited space prevents the presentation of a synopsis of the views entertained by the author on these important points, we close this brief notice with the recommendation to the reader who may desire to know how to work with the microscope properly, that if he has not a copy of this edition, to secure one, and if he has the third edition, do as we have done, buy the fourth. J. H. McQ.

THE CANADA JOURNAL OF DENTAL SCIENCE. Edited by W. GEORGE BEERS, Montreal, and J. SEWART SCOTT, M.D., Toronto. W. George Beers, Publisher.

The first number of this magazine (a notice of the contemplated publication of which appeared in the April number of the DENTAL COSMOS) has been received, and presents a very creditable appearance. In addition to a number of original communications, and the reports of societies, editorials on various subjects are presented, the elevation of the status of the dental profession in Canada in particular receiving

marked attention. Welcoming it as a valuable medium for advancing the interest of dental surgery to the ranks of dental journalism, we wish the magazine every success and lengthened period of usefulness.

J. H. McQ.

CORRESPONDENCE.

DENTAL SOCIETIES IN NEW YORK.

To the Editor of the Dental Cosmos:

In pursuance of the provisions of an act of the Legislature of New York for regulating the practice of dentistry, published in the June number of your journal, a meeting of dentists in the City and County of New York was held in the Cooper Institute on Tuesday, June 2d, to organize a dental society for the first judicial district. The State is divided into eight districts, and similar organizations were doubtless formed in each district, at the places authorized, on the same day, but your correspondent has knowledge at present only of those held in the Cities of New York and Brooklyn.

About sixty dentists attended the meeting at Cooper Institute, and a very lively interest was manifested in the proceedings, which occupied the afternoon from two to six o'clock. Dr. O. A. Jarvis was elected temporary president, and the following permanent officers were then chosen:

President.—Dr. A. L. Northrup.

Vice-President.—Dr. A. C. Hawes.

Secretary.—Dr. W. C. Horne.

Treasurer.—Dr. E. G. Roy.

The President, pro tempore, then declared the society legally organized, under the provisions of the act above mentioned, and the President having been duly installed, the following delegates were elected to organize the State Dental Society at the City of Albany, June 30th:

Drs. A. C. Hawes, W. H. Allen, E. A. Bogue, O. A. Jarvis, J. G. Ambler, John Allen, W. H. Atkinson, W. Carr.

The following censors for the district were then appointed, their duties being to pass upon the qualifications of persons desiring admission into the society, or to possess its certificate of qualification to practice:

Drs. G. E. Hawes, W. A. Bronson, C. E. Francis.

The President was authorized to fill any vacancies which might occur among the delegates or censors; and the society then adjourned to meet on the first Tuesday in July, one week subsequent to the meeting of the delegates at Albany.

The society for the second judicial district was organized at the City Hall in Brooklyn, the Common Council Room being placed at the disposal of the dentists by Mayor Kalbfleisch, and the following officers were chosen:

President.—Dr. W. B. Hurd.

Vice-President.—Dr. G. A. Mills.

Secretary.—Dr. W. Jarvie, Jr.

Treasurer.—Dr. H. G. Mirick.

Delegates to form State Society.—Drs. W. B. Hurd, H. G. Mirick, G. A. Mills, E. A. Cook, and O. E. Hill, of Brooklyn; Drs. Straw, of Newburg, W. C. Elliott, of Sag Harbor, and C. A. Smith, of Hempstead.

The President was empowered to appoint district censors.

This society also appointed eight delegates to attend the American Dental Association at Niagara.

It will be seen by reference to the law that the State Dental Society after its organization elects a board of State censors, one from each judicial district, and that this board has all the powers of a dental college.

The American Dental Convention, represented almost exclusively by New York dentists, held a few sessions, of no great account save the laudation of their wares by owners of different patents in the department of mechanical dentistry. Dr. A. Starr stated that his aluminium solder (patented) was composed of seven parts aluminium and one part pure tin. Dr. J. B. Newbrough presented the claims of his iodized rubber and McClelland his collodion base. Dr. John Allen maintained the superiority of continuous gum over all these innovations. On the second day a member, taking compassion on the lingering state of the Convention, endeavored to bring about its "happy dispatch" by a motion to adjourn *sine die*. This failed, but on the next day, there being very few in attendance, when the election of officers came up, Dr. Atkinson moved that Dr. J. M. Crowell be declared President for the ensuing year. There were two votes for the motion, and it was declared carried before the others present had recovered from the surprise of this flank movement. After this the Convention very properly adjourned.

On Wednesday evening, June 10th, the Brooklyn Dental Association held its sixth anniversary at the residence of Dr. J. C. Munroe, of Brooklyn. An election of officers was had, resultiug in the re-election for the sixth time of Dr. W. C. Parks as President, with Dr. O. E. Hill as Vice-President, Dr. A. P. Merrill as Secretary, and J. S. Latimer as Treasurer. The annual address was delivered by Dr. W. C. Horne, giving a sketch of the rise, progress, and influence of the Society. Some time was occupied in the consideration of the new base of Dr. McClelland, of St. Louis. Statements both favorable and unfavorable to its durability were made. The terms for license to use it are $100 for the first five years, payable in advance in one payment, and about $40 for the necessary apparatus, with instructions in manipulations. The cost of the material for a single case was stated to be about $1 50, and Dr. McClelland's charge for making sets for dentists $20. These prices being considered pretty steep, a resolution was passed requesting the patentee to put his material on trial by the profession, on the basis of

$20 for a license for one year. At a late hour the Association adjourned to partake of an elegant entertainment provided by Dr. Munroe.

The prospects are that there will be a large representation of dentists from this vicinity at the meeting of the American Dental Association at Niagara. W. C. H.

DR. FRANKLIN AND THE ST. LOUIS DENTAL COLLEGE.

St. Louis, June 9th, 1868.

Editors Dental Cosmos:—I observe in the Dental Cosmos of June a communication reflecting somewhat pointedly upon me as one of the "corps of Professors," advertised in the circulars of the "St. Louis Dental College." In my reply to Dr. Kulp, D.D.S., I take this opportunity to inform him, and all others who may have an interest in the subject, that I have some time since ceased my connection with the above institution, and withdrew as soon as it appeared to me that the purposes for which it was chartered were entirely ignored by its founders.

It is true I consented to act as its Dean, and also to hold the Chair of Surgery in said college, upon the ground of presumed good faith on the part of those more closely interested in its welfare than myself. When I observed that it was not the intention of some connected with the enterprise to comply with the terms of their published announcement, I at once ceased my connection with the institution, and have no idea of becoming again identified with it.

I make this explanation reluctantly, but as an imperative duty to myself as well as to others, with whom the affairs of the institution have drawn me in personal relation.

I am, sirs, very truly your obedient servant,

E. C. Franklin, M.D.,

Prof. Surgery Home Med. College of Missouri.

RUBBER SUITS.

Auburn, N. Y., June 20th, 1868.

To the Editor of the Dental Cosmos:—At the term of the United States Circuit Court now in session at Canandaigua, N. Y., a motion was made by Charles F. Blake, Esq., counsel for the Dental Vulcanite Company, for an injunction against Drs. Smith of Syracuse, Harris of Skaneateles, and Watson and Tripp of Auburn, to restrain them from using the hard rubber for dental purposes. The motion was successfully opposed by W. H. Davis, Esq., of Utica, counsel for defendants, and the injunction denied in every case with costs.

Very truly yours,

L. Matson.

PERISCOPE OF MEDICAL AND GENERAL SCIENCE IN THEIR RELATIONS TO DENTISTRY.

BY GEO. J. ZIEGLER, M.D.

"*Mechanical Treatment of Oral Deformities.* By ROBERT RAMSAY and J. OAKLEY COLES, ESQS.—Modern discoveries and inventions have allowed the dental profession to progress rapidly during the last ten years in this branch of their science. Mechanical appliances for substituting parts which have been left defective by congenital malformation, or for restoring parts which have been carried away by disease, can now be so perfectly replaced artificially that an account of the two following cases may be interesting to surgeons generally, and particularly to those members of the profession whose special practice may have brought them in contact with similar deformities; for, as will be demonstrated as we proceed, the deficiency or loss of substance was so great that surgical treatment of either of them would have been impossible. These cases will, we feel assured, be the more interesting when we say that such or others very similar are far from being uncommon.

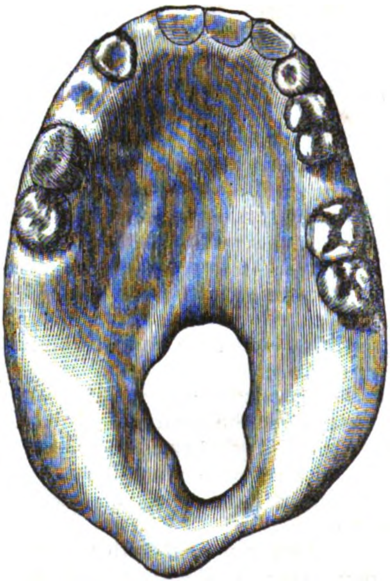
"There are, however, special as well as characteristic features in both the cases we now have to describe. Both were the result of disease. In one case the loss by ulceration was exclusively confined to the soft palate; while in the other a large portion of the superior maxillary bone was destroyed, the soft palate remaining perfect from being untouched by the ravaging disease so closely adjacent.

"The treatment of these cases was not unaccompanied with peculiar difficulties. In regard to the former, they were: (1) the aperture being confined entirely to the soft palate, there was no firm base for receiving and keeping in its place such a delicate instrument as it was necessary to employ; (2) the degree of elasticity required in that portion of the instrument which would have to cover the edges of this fissure; and (3) the necessity for producing a perfect closure, without at the same time causing any painful irritation by pressure, for this would have induced, in all probability, a return of ulceration, and thereby caused further loss of parts. It was not less important for the comfort of the patient than it was for the credit of the operator that these points should be studiously and steadfastly kept in view.

"The means that were adopted for overcoming these self-evident operative difficulties may now be briefly related. In the first place, as the professional reader will judge, perfect impressions of the injured parts were necessary. These could not be taken, however, by the usual process adopted by dental surgeons, viz., by the use of wax; for the force requisite to obtain an impression in this material would have so distorted the soft palate from its normal or resting form that any model thus taken would have been altogether untrue, and therefore valueless. The use of plaster of Paris was then the only alternative left. By introducing this substance in a form so liquefied that it was of the consistency of thick cream, the pressure required to pass enough of it above the edges of the fissure did not displace the most delicate folds of mucous membrane. In a few moments it was sufficiently set to be withdrawn, and on inspection a model was presented, not with a 'dragged'

appearance, as a dentist would term an unsatisfactory attempt, but with clear, sharp, and well-defined outlines. Thus a model, which contained an accurate impress both of the dental arch and what remained of the soft palate, was secured. From a drawing of a cast taken from the model, we are enabled to present, in Fig. 1, an exact copy of the upper part of the patient's mouth as it was presented to us for treatment.*

Fig. 1.



"By working to this model, the required moulds were made for receiving the material to be shaped into form. This material was a composition of india rubber prepared for vulcanizing. The plug—if we may use so plain a term, with a view to be clearly understood—was necessarily of a most flexible quality of this compound; while the front part of the instrument, which would have to carry the teeth to be replaced, as well as the plug, was of the usual ebonite quality employed in dentistry. The supple yet unalterable character of the one part, and the rigid, indestructible condition of the other, are suggestive examples in juxtaposition for showing the incalculable value of india-rubber, indicating as they do the numerous and efficient uses to which it may be turned. The following Figures (2 and 2*a*) will show the bearer of the plug and the plug itself in detached parts.

Fig. 2

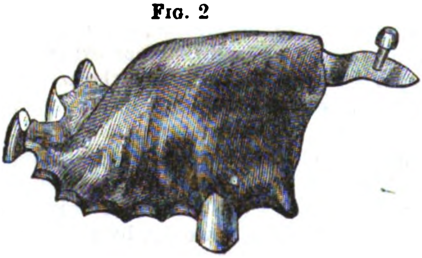
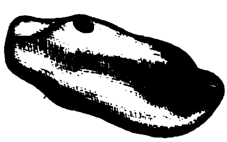


Fig. 2*a*.

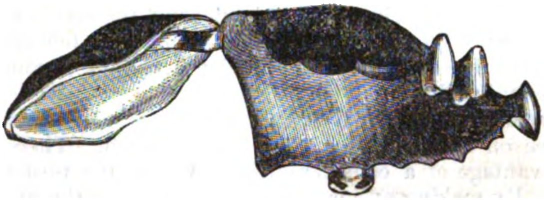


"The next illustration (Fig. 3) shows the instrument in a complete form for inserting in the mouth. Here we may incidentally remark that, as the elastic portion is made in a metallic mould, it may be duplicated in any number; and so easily may this be done that in this instance the patient, who was going to India, was provided with a mould and a small vulcanizing apparatus, whereby he was able to construct a new plug when necessary.

* We have been favored with these drawings by the authors.

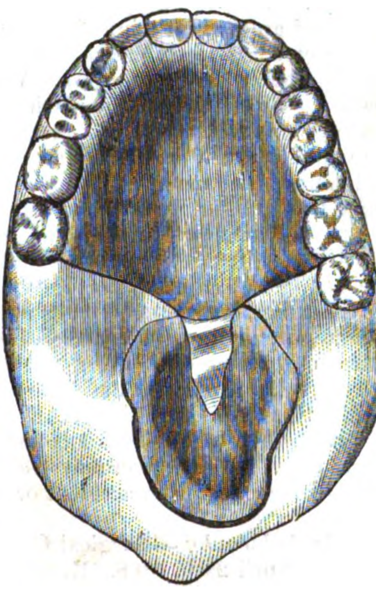
"Simple as this instrument may appear when thus presented, we may say it required some weeks' close application to bring it to this degree

FIG. 3.



of perfection. When the moulds were satisfactorily completed, however, the remaining processes were readily accomplished. The hard rubber front piece (Fig. 2) fitted so perfectly that it was kept firmly in its place by the power of suction, at the same time that it pressed the plug (Fig. 2*a*) upwards with equal consistency. The whole instrument, when *in situ*, presented the appearance which is conveyed in Fig. 4.

FIG. 4.



"The result of the instrument being in its position was highly satisfactory to ourselves, as well as to the patient. The gap was kept perfectly closed, even when the muscles were subjected to strong action, and this without any chafing of the parts on which the plug pressed.* Under these conditions, the symmetry of the mouth having been fairly restored, its natural functions returned. Deglutition, which had previously been both difficult and painful, from food passing the fissure and lodging above the palate, was now proceeded with in ordinary comfort; while articulation, instead of being very defective in tone, from sounds escaping through the posterior passages of the nares, in a short time resumed the character which belongs to perfect organs. Indeed, the delay in this particular arose more from the time which was required for the tongue to get adapted to the instrument than from any shortcomings in the instrument itself.

* It is highly probable that this orifice might be entirely closed by a surgical operation in bringing the parts together by metallic or other ligatures. We have seen a much more formidable case of complete congenital fissure of the soft and part of the hard palate, with the sections of the uvula widely apart, in a young lady, partially closed by a single operation, the gap in the hard palate being left open in consequence of the difficulty of approximating the opposing tissues and the fear of attempting too much at one time.—Z.

"A description of the second case,* and the way it was treated, may be given in a few sentences. A model of the mouth was obtained in the way already described. In this case there were certain difficulties of a totally different character from those presented in the previous one. Here the bone was entirely gone to the floor of the orbit. Fortunately, however, the entire length of the nasal septum was left intact. But, as it will have been inferred, deglutition was very troublesome, and speech scarcely intelligible.

"In operating, the principal difficulty which presented itself was the small surface on which suction could be produced. There was, however, the advantage of a considerable overlap at the posterior portion of the gap. By making an instrument in two parts, the mouth was so far restored as to be completely efficient for purposes of mastication and articulation.

"In conclusion, we may briefly revert to one or two important or special points in the required practice attending these cases. The great advance made in treating them is largely—indeed, we may say almost entirely—owing to the introduction of vulcanized rubber into this country. The various qualities into which this substance can now be tempered are a great triumph for scientific inquirers and of artistic skill. It is now so perfectly prepared that it may be used in the mouth without unpleasantness or danger. When hardness is required, it can be made as rigid as bone; and when suppleness is necessary, it can be made so soft and velvety as exactly to resemble the part of the body for which it is required to act as a substitute. While, too, this elasticity and softness are imparted, so springy does it become that no reasonable amount of pressure will prevent it, on being again set free, from returning to the exact form it was when taken from a mould.

"Another important point is the method of depending on suction for the support of these instruments, instead of trusting to natural teeth for a bearing, which must in consequence be ultimately injured. This is a step in advance in conservative dentistry which has not yet been sufficiently recognized. And not less so is the practice of taking impressions in plaster of Paris, instead of wax and other old and new-fashioned plastic compositions.

"With these agents at his command, and the required skill in using them, the dental surgeon may treat almost every case of deformity to which the mouth, from accident or disease, is liable."—(*The Lancet.*)

"*Staphyloraphy.*—Surgical Clinic of Prof. Gross, Jefferson Medical College, April 29th, 1868. (Reported by Dr. Napheys.)—Robert S., æt. 18, from Ohio. This patient came to Prof. Gross on account of cleft in the palate, congenital in character, as it generally is, involving simply the soft parts. He was operated on last Friday a week ago. The edges of the fissure were pared, making raw surfaces of them, precisely as in the operation for hare-lip, and then the parts were approximated with five twisted sutures, retained by means of shot. There was then introduced between two of these sutures an ordinary interrupted suture. Perfect union has been obtained with the exception of a little point toward the apex of the cleft, so small as hardly to be visible. The resulting inflammation was not more than was expected and desired. The

* The wood-cuts illustrating this case have not been received.

interrupted suture was removed at the end of the fifth day, the others at the end of the eighth. The edges of the surface were touched with a weak solution of nitrate of silver, ten grains to the ounce, and yesterday and to-day with the solid stick of nitrate of silver.

"The little opening left seems to be perfectly round, and if still remaining can be readily closed by the introduction of another suture next October, as he is anxious now to go home.

"The patient was fed abundantly after the operation, which is a matter of great importance. He is now taking exercise in the open air, and will probably go home next Friday. He has been able to swallow well ever since the operation. It will be a good while before there is much improvement in speech, which can only be effected by daily, constant instruction and practice in the pronunciation of the alphabet."—(*Med. and Surg. Reporter.*)

"*Necrosis of Lower Jaw.*—Jacob M., æt. 12. This patient, a stout, hale-looking boy, came under Prof. Gross' observation last summer. He had had a tooth extracted; during that operation the probability is that the alveolar process was broken, leading to inflammation followed by necrosis of the right side of the lower jaw bone. The parts were scraped, some dead bone removed, and for awhile the case was progressing favorably. Afterwards an abscess formed, and the lad presented himself last week with two papillæ, nipple-shaped processes, over the right ramus of the lower jaw.

"Necrosis is a very common affection not only of the jaw bone, but of various portions of the skeleton. In the jaw bone it may be produced by violence, or be the result of ordinary inflammation, or inflammation of a specific character, scrofulous or syphilitic. In this case it was produced by injury inflicted in the extraction of a tooth. The alveolar process was fractured, followed by its inflammation, death, and removal of a portion; for some pieces of bone had been discharged before the patient applied for treatment. At the operation referred to, several pieces were also removed. The case was doing well for some time, but it was apparent the lad was not cured. Subsequently the inflammation extended to the ramus and posterior portion of the body of the bone, leading to necrosis, as is indicated by the nipple-shaped processes present.

"The boy was put under the influence of chloroform. The probe came in contact with a rough surface of bone. The two openings were connected with the knife, and a large piece of dead bone extracted. The two masses of semi-organized granulations were scraped away, which must always be done, for as long as they exist there can be no healthy action.

"The part should be kept clean by syringing with tepid water, or water impregnated with permanganate of potassa or chlorinated soda, making a detergent lotion.

"This case illustrates the fact that the extraction of a tooth not well performed may be followed by prolonged suffering. It was upwards of a year ago that the extraction was effected."—(*Ibid.*)

"*Cause of Caries in Teeth.*—It has been established by an English surgeon (Dr. I. P. H. Brown) that this condition of the teeth commences to manifest itself in many women after fecundation, for during that state the mother is called on to furnish precisely this calcareous

element for the development of the fœtal structure; and when this assimilating material is insufficient, the fœtal organization must be supplied at the cost of the bone proper of the teeth—a material difficult of repair, but admitting of ready and rapid deterioration. Dr. Magitot, in his new treatise on dental caries, demonstrates that the saliva of the mouth, in consequence of the change in its composition, in various diseases, as typhoid fever, dyspepsia, etc., exercises a hurtful influence, and is a true cause of dental caries."—(*Gazeta Med. da Bahia* and *Nash. Journ. Med.*)

Arrested Development of the Human Body.—"The following remarks of Dr Schauffausen, at the last meeting of the Medical and Natural History Society at Bonn, upon the post-mortem of a dwarf, are interesting. The dwarf in question had died at Coblenz, at the age of sixty-one. Such an age among dwarfs was very rare, although a case had been noted in Scotland where the age of sixty-three had been attained. This dwarf had grown after he was thirty years old; however, the same phenomenon had been remarked in Bebe, the dwarf of King Stanislaus. In this case there was a remarkable contradiction in the signs of bodily development, for when old he had lost his front teeth, but had not a single gray hair, and no trace of baldness. The first change of incisor teeth had not begun until he was twenty-two years of age. His height was two feet ten inches, and his weight forty-five pounds. Most of the relations of his body had retained a childlike ratio. The circumference of his head, 520 millimetres, corresponded with that of a boy five years old. The brain weighed 1183·33 grammes. The brain of a man of sixty years of age is said to weigh, on the average, 1344 grammes. Among new-born children, the weight of the brain was one-fifth of the weight of the entire body; among adults one-thirtieth up to one-forty-fourth; but in this case it was one-nineteenth. All the sutures of the skull remained open, and had bony cartilages, as in early childhood. The brain showed numerous deep convolutions, and the deceased had, if not remarkable, at any rate fair mental qualities. A simple arrest of development seemed to affect all organs of the body, and consequently he was not virile. This dwarf was the child of large parents, and he had two brothers five feet high, and a sister of ordinary size; but his other two brothers, who are still alive, are dwarfs, one the same size as himself, and the other five inches higher."—(*The Lancet.*)

Arrested Development.—It is stated (*Med. Investigator*) "that at the late meeting of the Massachusetts Homœopathic Society, attention was called to a very extraordinary, if not unique, case of arrested development, and the child or young woman, the subject of it, was presented upon the platform. She had the appearance of a child of five or six years of age, but in fact was twenty-four years of age. Up to the age of five and a half years she was a bright, healthy child, but at that period had a severe attack of brain fever, and recovered after a somewhat prolonged sickness. The consequence of the disease was an entire suspension of development, both mental and physical. She remains precisely as a child of the age mentioned, and is interested only in childish affairs. Within a few years she has shown symptoms of old age, and her habits are, in some respects, like those of an aged woman. She has the temporary teeth, somewhat decayed, but no sign of permanent teeth. Her height is three feet five inches, and weight forty-four pounds."

Hereditary Transmission of Hare-Lip.—"M. DEMARQUAY lately asked the advice of the members of the Surgical Society of Paris touching a little girl, five years old, who presented a double hare-lip. Some difficulties will be encountered in the operation, but the interest of the case lies in the fact that, in the family, from the grandparents downwards, eleven children have been born with hare-lip, or with a peculiar conformation of the lower lip—namely, two openings on either side of the mesial lines, traversing the whole labial thickness, with a peculiar form of the lip itself. To this latter defect M. Demarquay had called attention, in the *Gazette Médicale*, as early as 1845."—(*The Lancet.*)

Teeth at Birth.—"M. GUÉNIOT related to the Société de Chirurgie the case of an infant which, when nine days old, exhibited a spontaneous expulsion of the two middle upper incisor teeth, together with the destruction and expulsion of the dental bulb. There was some gingival stomatitis, but no abscess of any kind. The teeth resembled two solid shells, covered with a thin layer of enamel. These cases are rare. In connection with this subject, M. Guéniot enumerated several celebrated persons who are said to have been born with teeth, such as Mirabeau, Mazarin, Louis XIV., to which he would have added that of M. Broca had not this gentleman disclaimed any right to such a distinction. Believing the fact generally admitted, that infants are occasionally born with teeth ready cut, we are greatly surprised to find so experienced an accoucheur as M. Blot utterly denying its accuracy. He says he has never met with an instance of its occurrence in 30,000 infants that have come under his observation, and the experience of his colleagues is just as negative. However, that unfailing repertory of information, M Giraldès, was enabled to refer to numbers of cases of children born with one or more teeth; and he has met with similar cases in his own practice. M. Besnier observes also that such cases are familiar enough to matrons, who are in the habit of at once extracting the teeth. We suspect that this operation must have been already performed in cases that otherwise would have attracted M. Blot's attention."—(*Med. Times and Gaz.*)

Replacing Drawn Teeth.—H. L. EADES writes to the *Sci. Amer.*: "In No. 17, current volume, I notice the statement of a dentist of Zanesville, Ohio, who had extracted and replaced a molar tooth for a lady, which had done good service for the space of eleven years, and now had to be again extracted, being found aching from an exposed nerve. What is singular about it is that the nerve, after having been broken, should again reunite. A short time previous to that spoken of by him, while I was practicing dentistry in Ohio, a young woman applied to me to fill the cavities in two large incisors. Upon examination I found them so far gone that the task to me would be very difficult, and to her too painful to endure. The surroundings seemed to be sound, with but slight inflammation, so I made the novel proposition to extract, fill, and replace them, to which she consented. I prepared a small vise, fitted the jaws with soft pine, and after getting everything in readiness, I placed her slightly under the influence of chloric ether and extracted the one which was worse decayed; found the lingual surface nearly gone. I placed it in the vise, cleaned it, making the orifice entirely through, and consequently had to fill from the inner angles on each side, all of which I performed in about five minutes, when I again

administered a little ether, replaced said tooth, and extracted the other, and proceeded as with the first, which occupied three or four minutes —the whole being performed inside of ten minutes. I lately heard from her: the teeth remain as sound as they were when I filled and replaced them, doing good service. Any doubting dentist can satisfy himself of the truth of this statement by applying to the lady herself, Susan Liddill, who resides at Union Village, Warren County, Ohio. The nerve in one of these teeth was dead before the tooth was extracted, and both of them doubtless received their nourishment from the surrounding alveolar process. How long they may be nourished from this source and be of service is yet to be determined.

"I tried the experiment on a young man, which also proved a success; but it has been some years since I heard from him. I also tried with others, partially decayed bicuspids and molars, but did not succeed in getting them into paying service, as they had to be re-extracted in a short time. But I do not see why a perfectly sound one might not reunite with the alveolar process or surrounding walls, and thence receive nourishment and become serviceable."

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Replacing Drawn Teeth.—C. E. Whitmore, of N. O., states (*Ibid.*): "In the year 1853, I had three teeth extracted at the same sitting; the first tooth extracted was sound. At my request the doctor replaced it, and laughingly remarked that it would not take hold, as it was out too long and had become cold, thereby losing its natural heat. I returned home, took the tooth out and again replaced it myself; it remained there until the year 1866, when it became so loose that it was an annoyance to me when eating, and I extracted it."

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Transudation of Blood Corpuscles.—"The subjects of hæmorrhage from the capillaries and of the mechanism of suppuration have recently received considerable light from the microscopical observation of a German observer, Dr. Cöhnheim. By bringing frogs under the influence of woorali poison, and then tying the femoral vein, he has been enabled to watch the phenomena of capillary congestion and the resulting ecchymosis taking place in the transparent tissue of the frog's web. The remarkable point in his observations is, that he has seen the red blood corpuscles making their way through the walls of the capillaries, apparently without rupture, into the surrounding tissues. In like manner, in the case of inflammatory action, he has seen the pale corpuscle becoming adherent to the wall of the vein, making its way through the wall, and appearing on the outside as the pus corpuscle. Not the least interesting portion of a very capital meeting of the Pathological Society, on Tuesday, was that occupied by Dr. Charlton Bastian, who gave an account of Cöhnheim's observations, and exhibited two frogs in the webs of which the phenomena of the passage of the red corpuscles were apparent. Dr. Bastian describes the process as one of adherence of the corpuscle to the capillary wall, then the protrusion of a small tag or process of the corpuscle through the wall, which is followed by a larger and larger portion of the corpuscle, until the whole has escaped. From his observations he is inclined to believe that the process is due to the properties or endowments of the corpuscle, rather than to any merely mechanical force."—(*Med. Times and Gaz*)

Transudation of Blood Corpuscles, etc.—"In our last number we drew the attention of our readers to the interesting observations of Cohnheim upon the passage of the blood corpuscles through the walls of the small veins and capillaries, and to the explanation offered by Dr. Bastian of the mode in which this takes place. We now propose to consider more in detail certain points in connection with these important experiments.

"Before proceeding to discuss this subject, however, we desire to point out that a claim of priority in these investigations really belongs to our distinguished countryman, Dr. Augustus Waller, who, as early as the year 1846, observed the same facts, and drew almost exactly the same conclusions therefrom, as Dr. Cohnheim has recently done. Dr. Waller published in the twenty-ninth volume of the *Philosophical Magazine* (1846) an account of several observations he had been making upon the tongue of the frog, and among other facts he records having watched the escape of both the red and the white corpuscles from the capillaries under very much the same circumstances as those which have been recently employed.

"Thus, he states (pp. 285, 286), 'Recent observations have enabled me to decide the much agitated question as to the formation of pus, and its origin from the extravasation of the colorless or spherical corpuscles from the capillaries.'

"He then proceeds to detail the results of two experiments, in one of which he observed the white corpuscles escaping from the vessels in the mesentery of a toad, while the only traces of their points of exit 'were curved indentations in the vessel of the same size as the corpuscles, and a solution in the continuity of the parietes of the vessel at these points.' In the second experiment the tongue of a frog was employed, and in this case both the red and white corpuscles—the latter, however, in by far the greatest number—escaped through the walls of the capillaries, while 'no appearance of rupture could be seen in any of the vessels. The corpuscles were generally distant about 0·03 mm. from their parietes. After the experiment had lasted about two hours, thousands of these corpuscles were seen scattered over the membrane, with scarcely any blood disks. The process by which they passed out of the vessel could be best observed in a capillary containing stationary blood particles. Generally at a slight distance from it some extravasated corpuscles could be detected, and at the nearest opposite point of the tube a small concave depression was presented. Frequently near this depression numerous corpuscles were collected within the tube, as if about to follow the rest, which had escaped. These were frequently agitated by a movement of oscillation, which showed that there was no open point in the tube. In other spots some of these corpuscles were seen protruding half out of the vessel. Whenever the current reoccurred in a vessel presenting these appearances, the depression and unevenness quickly disappeared, and no trace of the corpuscular extravasation could be seen, except the presence of the corpuscles themselves. I consider therefore as established: 1. The passage of these corpuscles *de toute pièce* through the capillaries. 2. The restorative power in the blood, which immediately closed the aperture thus formed.'

"In a second communication (p. 397), entitled 'Microscopic Observations on the Perforation of the Capillaries by the Corpuscles of the Blood, and on the Origin of Mucus and Pus Globules,' Dr. Waller shows most conclusively the identity of the white corpuscles of the

blood with those of mucus and pus, and gives an account of several experiments which he had made to confirm his original observations. With regard to the mode in which corpuscles escaped from the vessels, Dr. Waller had evidently come to no satisfactory conclusions. He points out that it is not essentially connected with the life of the animal, as it is observed to take place after death, and he suggests that it may be due to a solvent action of the corpuscle upon the structures composing the wall of the vessel. The essay is illustrated with plates, which clearly show that Dr. Waller had observed all the phenomena which have been recently brought so prominently before the public.

"In referring so fully as we have done to this subject, we would disclaim any desire on our part to depreciate the value of Dr. Cohnheim's rediscovery of a lost fact, which appears likely to have most important bearings upon the progress of pathology; but we think it due to our distinguished fellow-countryman to establish his claim to the honor of the original discovery. The questions which Dr. Cohnheim has attempted to solve are, in the first place, the formation of pus from the white blood corpuscles, and, in the second, the mode in which the red corpuscles escape without any apparent lesion of the capillary system. The method of experimentation is exceedingly ingenious; and as the details are likely to prove of interest to those of our readers who have not yet had an opportunity of examining the subject themselves, we have explained them at length on another page.

"To obtain the first result, the mesentery of a frog paralyzed with woorara is exposed for some hours, the surface being occasionally moistened by an artificial serum; the various phenomena of inflammation may be observed to take place, and on the occurrence of stasis, or rather during the preceding oscillating stage, the white blood corpuscles, which have become apparently attached to the walls either singly or in groups, gradually give rise to a bulging of the vessels, the corpuscles thus lying in pouch-like cavities projecting from the tube. Presently the corpuscles cease to be seen within the capillaries, and may be seen lying free in the tissue around it; sometimes they may be caught in the act of escaping, but it is extremely difficult to determine the exact course which they follow through the wall of the vessel. After their escape no difference can be observed between them and the others which remain within the vessels. Our leading histologists have long been agreed that pus corpuscles are related to the white blood corpuscles both in structure and in origin. Virchow traces the formation of pus from the nuclei of connective tissue, and on free mucous surfaces from the epithelial cells; he fully recognizes, however, the connection between the pus and blood corpuscles, and makes use of the following remarkable expression: 'Both have a like type of formation. It may therefore be said that pus has a *hæmatoid* form: nay, the old doctrine may be revived afresh, namely, that pus is the blood of pathology.' ('Cellular Pathology,' p. 482.)

"This new view, then, of the development of pus presents no feature at variance with received doctrines, and the great question yet to be determined is whether this is the only or even the most common mode in which the process takes place, and for the answer to this we must look to the future.

"The second experiment consists in producing congestion of the capillary system in the web of a frog's foot by the application of a ligature to the femoral vein. The resulting phenomena are: 1. Retardation

of the stream. 2. The occurrence of oscillation. 3. Stasis. This is followed by massing together of the corpuscles and the adhesion of a few red corpuscles to the walls of the vessels which usually become pouched at these points. On relieving the congestion by removing the ligature, the conglomerates of corpuscles break down, and the stream speedily recommences. The corpuscles, however, which had become adherent to the walls are now seen to pass through them, and to appear in the surrounding tissues. They are followed by others, and soon the spaces between the capillary network will become loaded with blood globules. They may be watched in every stage of their transit. In attempting to determine how this proces takes place, we have to consider, first, whether there are really apertures in the vascular parietes; and, second, whether the result is due to any peculiar properties of the blood corpuscles themselves. Dr. Cohnheim inclines to the belief that interspaces exist between the cells of the lining membrane of the smallest vessels, and in this view he is supported by the fact that openings have been proved to exist in the smaller branches of the lymphatic system, apparently in connection with the stomata-like orifices in the epithelium of the serous membranes, through which branches of considerable size may be injected. The existence of such orifices is, however, still a matter of dispute; and whether this be so or not, it is most probable that the blood-corpuscles themselves take an active part in the process. The amœba-like movements of the white blood corpuscles have recently attracted the attention of several able observers. Professor Max Schultze states that he has even seen them protrude arm-like processes, and embrace minute granules of organic matter, such as abound in the molecular base of chyle or milk. Endeavors have been made by more than one observer to determine whether these movements are influenced in any way by disease, but, up to the present time, with indifferent success. More recently attention has been directed to similar movements on the part of the red corpuscles under certain conditions, especially that of exposure to a moderate heat. Some have viewed these latter movements as purely physical phenomena, and in no way connected with the individual life of the corpuscle; but analogy would induce us to consider this view as incorrect. The theory of the individuality of cell-life has, moreover, been steadily gaining ground of late years, and the whole tendency of modern physiological and pathological teaching has been in this direction After a careful examination of such specimens as those exhibited by Dr. Bastian at the last meeting of the Pathological Society, few can fail to be convinced that the corpuscles themselves are really active agents in their migration through the vascular walls; and when this fact is fully recognized much light may be thrown upon hitherto obscure blood diseases."—(*Med. Times and Gaz.*)

Bichloride of Methylene.—"The attention of the Medical Society of London seems to be specially directed at the present time to the subject of anæsthetics. On Monday night, MR. PETER MARSHALL read an excellent practical paper on the value of bichloride of methylene for the production of general anæsthesia. Mr. Marshall has constantly administered this agent during the past six months, both in private and hospital practice, and for the performance of capital operations, and he has arrived at the conclusion that it is preferable in all respects to chloroform. Mr. Marshall referred in detail to the discovery of the bichloride of methylene, pointing out that this was a matter of pure induction; and

he contrasted the agent, in its chemical composition and characters, with ether and chloroform, arguing that it possessed—what *à priori* we should be led to expect—properties of an anæsthetic in an eminent degree, comparing in this respect favorably with other agents now in use. Mr. Marshall declared that his experience led him to conclude that the bichloride of methylene was more manageable than chloroform; that anæsthesia was more readily produced by it, and more persistent; that there was less excitement and what might be called inebriation than in the case of chloroform; and that its exhibition was not followed by headache or prostration, nor so frequently by vomiting. It had never yet proved fatal, and in those animals that had been killed by it there was found less disturbance of the equilibrium of the circulation, as shown by the congested and loaded state of the right side of the heart and lungs. Mr. Marshall observed that the price could not be said to offer any objection to its introduction, because the quantity required to be used was not great. He discards all complicated apparatus, and uses what amounts practically to a cupped sponge fitting over the mouth. About half a drachm is first used, so that the patient may get accustomed to the slight pungency of the anæsthetic. When the operation to be performed is slight, the insensibility should be rapidly produced by a free use of the agent; but when the operation is severe, the anæsthesia should be more slowly brought about. A good deal of squinting is observed during the exhibition of the bichloride; but this need cause no alarm—it has no more dangerous significance than the upturning of the eyes during chloroform inhalation. Mr. Marshall mentioned several cases in which he had given the bichloride for tooth extraction, and he did not observe any of the disagreeable after-effects of chloroform to follow. Mr. Clover referred to the success of the exhibition of chloroform by his method, and implied that many of the disagreeable after-effects of chloroform were due to the improper mode in which it was administered. He, however, expressed himself as gratified at Mr. Marshall's statement. The paper, we understand, will shortly be printed in a separate form, and the profession will then be able, after a careful study of it, to determine how far the bichloride of methylene is likely to supplant chloroform. We should add that it is not unlikely that impure compounds may find their way into the market, and act unfairly in the determination of the value of the agent as an anæsthetic."—(*Lancet.*)

Methylic Ether—a New Anæsthetic.—"We have been favored by witnessing some experiments performed by Dr. Richardson with a new anæsthetic agent, methylic ether. This substance is made by acting on methylic alcohol with sulphuric acid, and washing the product with solution of potash. Methylic ether is obtained as a gas, but it is very soluble in ether and alcohol. One volume of water takes up thirty-seven volumes of the gas. Its chemical composition is $(CH_3)_2O$. The specific gravity of the vapor is 23. Dr. Richardson's experiments were performed with this gas dissolved in ether to saturation. As an anæsthetic agent it differs from ordinary ether in its lower specific gravity and in the fact that blood absorbs it much more readily. (According to Dr. Richardson, blood will dissolve at 60° Fahr. as much ordinary ether as would represent twenty-two volumes of vapor. At the same temperature blood will dissolve thirty-six volumes of methylic ether vapor. At the temperature of the body, 98°, the absorption would be in nearly half these proportions—*i.e.* the circulating blood would take

up eleven volumes of common ether vapor and eighteen volumes of methylic ether vapor.) The experiments we witnessed were made on pigeons. In one case the animal was placed under a bell-jar, and the atmosphere impregnated with methylic ether; in the other the pigeon was made to inhale the vapor from a kind of respirator. In both cases complete anæsthesia was very rapidly and easily produced. The sleep was quiet and perfect. The anæsthetic appears to produce its effect without agitation or convulsion, and it is not generally followed by sickness. In the case of one of the pigeons the eyes remained open during insensibility. The rapid action of this anæsthetic in all the experiments—less than a minute—points it out as likely to be specially useful in quick operations, such as tooth-drawing, where it is desirable that anæsthesia should be rapidly produced. Dr. Richardson has experimented on himself with this substance. It was observed that in his case there was no preliminary spasm about the larynx or elsewhere, no rigidity, no alteration of color, or lividity. The anæsthesia was perfect, was preceded by no convulsion, and followed by no sickness. During the administration the pulse rose to about 96. We hope in a succeeding number to give our readers some further details of experiments made with this very promising agent."—(*Med. Times and Gaz.*)

"*Ether Spray for Relieving Pain.*—Dr. Horaud, of Lyons, France, reports very favorably on this remedy. Although the influence of nebulized ether may not be permanently curative, it certainly is very valuable as a means of affording at least temporary relief in severe local pain, and especially in cases of neuralgia, the pain of which is at times so fearfully distressing."—(*Jour. de Méd. de Lyon* and *Humboldt Med. Archives.*)

Ether Spray as a Styptic.—J. Lindsay Porteous reports the following in the *Lancet:* "S. P——, a girl twenty years of age, came to the South Dispensary at 10 A.M. on the 14th of this month, suffering from considerable hæmorrhage following the extraction of a lower molar. The tooth had been drawn at 7 o'clock the previous evening, and the hæmorrhage immediately commenced, and continued all night, sometimes so profusely as to nearly choke her. Cold water and perchloride of iron were applied, which temporarily arrested the hæmorrhage. But after the patient had been home only a short time, the bleeding began with renewed vigor. At 3 o'clock P.M. she came back here very weak and frightened. Nitrate of silver was applied, the alveolar cavity stuffed with lint, and a bandage placed so that the jaws could not separate. This was kept on for six hours, and then removed, when a stream of blood rushed out, and the patient fainted. Seeing that ordinary remedies had failed, I thought of ether spray; so I got some common ether, and applied it by means of Dr. Richardson's apparatus, which allowed me to send the cold right down into the cavity. The effect was wonderful. After two applications, neither lasting longer than one minute, the bleeding ceased, and has not again returned."

Freezing Sections of Nervous System.—In a recent lecture by Dr. B. W. Richardson, at Hull, the *Med. Times and Gaz.* states that "two new points were adduced: first, that it was possible to produce local insensibility of a limb by freezing the trunk of the nerve feeding the limb; and, secondly, that when a section of the superficies of the brain,

after its removal from the dead body, was treated with a fluid that caused condensation of the structure, the so-called convolutions admitted of being separated almost into distinct segments or centres. A portion of brain thus treated was shown."

Permanganate of Potassa.—Dr. E. MONTGOMERY says (*Humboldt Med. Archives*) that "odontalgia has promptly yielded to the application of about a grain of the crystal to the hollow tooth, in several cases wherein I have used it."

Carbolic Acid in Burns.—Dr. E. R. SQUIBB states (*Med. Gazette*) that "some of the applications of carbolic acid are really but revivals of old methods of practice; thus creasote has a very deservedly high reputation as an application to burns, and as carbolic acid is medicinally at least identical with creasote, it is but changing the name of the agent. In my own person I have experienced its benefits, and once tried the following experiment: Accidentally scalded by a jet of steam, a solution of carbolic acid, which is kept constantly at hand for such purposes, was at once applied on a piece of lint, before the pain became severe. In two or three minutes the pain was gone. In an hour the dressing was removed and the pain then returned. The dressing was renewed and the pain again ceased, but to return again when the dressing was removed. This anodyne effect has not been explained as yet, and does not appertain to its peculiar character as an antizymotic. A boy employed in my factory broke a bottle of compound spirits of ether, saturating the front of his pantaloons; this then took fire from a lamp which he was using, and he was quite severely burned over the lower part of the abdomen, the genitals, and the upper part of the thighs. In my absence he was taken to his home and dressed with cotton and oil. In a few hours I obtained permission of his medical attendant to apply the carbolic acid, which was attended with speedy relief of his pain, and he had a quick recovery. This application of the carbolic acid is one of its most valuable uses."

Poisoning by Carbolic Acid.—DR. F. CRACE CALVERT writes to the *Medical Times and Gazette:* "I have read with sincere regret in your valuable journal the account of the death of a person from having accidentally taken an ounce of impure carbolic acid. I deem it my duty to inform your numerous readers that the best antidote to be administered after the stomach-pump has been used is large doses of either olive oil or oil of sweet almonds mixed with a little castor oil, for not only do they interfere with the corrosive action of carbolic acid, but they dissolve freely the acid, dilute it, and prevent its action on the mucous membranes. If at any time strong carbolic acid should come in contact with the skin, its caustic action can be entirely prevented by removing it with a little oil."

"*Syphilis contracted from Cigar Stumps.*—M. AMBROSOLI reports in the *Giornale Italiano della Mallatie Teneree* two cases of syphilis, contracted by chewing the stumps of cigars picked up in the street. The primary lesion was seated, in one case, upon the anterior pillar of the soft palate; in the second case upon the palatine arch."—(*Archiv. Gen. de Méd.* and *New York Med. Journ.*)

Bristle Probang for Extraction of Foreign Bodies from Œsophagus.—PROF. LEWIS A. SAYRE gives in the *New York Med. Journal* the following description of this instrument, and its employment for the removal among other things of an artificial denture from the œsophagus: "This instrument was invented I think by a surgeon in the East India service, but whose name I have never heard. For an emergency occurring some weeks previously, I had made one of these instruments in the following manner: I took an ordinary No. 10 elastic catheter and cut off about one inch from its lower end; I then ran through it a flexible whalebone about three inches longer than the catheter, and tied on its end a small piece of sponge. I then took to pieces an ordinary paint-brush, and tied one end of the bristles around the sponge, completely surrounding the whalebone rod with them. The other end of the bristles I tied around the cut extremity of the catheter. By a slight twisting, the bundle of bristles can be reduced in diameter to about the size of the catheter. By holding the catheter firmly with one hand, and with the other drawing upon the rod so as to bring the sponge toward the catheter, each of the bristles is bent into a loop, and the whole bundle is converted into a disk about five inches in circumference, large enough to completely sweep the œsophagus and to remove any foreign body lodged therein.

"The sponge having been dipped in water, the instrument was extended, and was readily passed the entire length of the œsophagus without obstruction; it was then distended in the manner described, and slowly withdrawn with a slightly twirling movement, so as to sweep all parts of the tube, and fortunately brought out the plate and tooth riding on its meshes without difficulty, and with scarcely any pain.

"The plate had at either extremity a hook fitting to the teeth for its retention in the mouth, besides a number of smaller points and ridges for the same purpose. Its dimensions were about two and a quarter inches from hook to hook, by one half inch wide. The tooth and gum which projected above and below the plate at right angles to it was about five-eighths of an inch in length by one-quarter in width.

"The lad had some tenderness in swallowing for a few days, which soon passed away."

Artificial Petrifaction of Animal Tissue.—Dr. W. P. Bain asserts (*Lancet*) that "Dr. Marini is the inventor of a mode of turning the human body or any part of it into stone, in any attitude that may be desired. I inclose the photograph of a senator of the Italian Parliament, taken four months after his decease, in which he is represented seated in his chair, with his clothes on, just as when alive, his eyes retaining in an astonishing degree the vivacity of life. I also inclose the photograph of a table, the slab of which is formed of pieces of the human body, brain, muscles, etc., all turned into stone, and which, when struck by me, sounded as a marble table. I also inspected a lady's foot, likewise petrified, and which had every appearance of marble, until upon close inspection the texture of the skin was apparent. Dr. Marini showed me, too, some specimens of the human body, which were in a moist and perfect condition, preserved for years. He assured me also that the week before, he had dined off a duck which had been killed months previously. The foot of a mummy was in his apartment at the time of my visit, in which the color assumed that of life, and the toes were perfectly flex-

ible. I am perfectly certain that these inventions are genuine, and of high value."

Hardening Plaster of Paris. "*A new Substitute for Marble.*—Sulphate of lime or plaster of Paris, when mixed with a certain portion of water and immersed for some time in hot pitch, loses its water, and absorbs the pitch in a corresponding quantity. When cold it forms a compound so hard as to be capable of being polished and used for manufacturing a variety of useful and ornamental articles."—(*Journ. of Applied Chem.*)

"*Cleaning Silver.*—When spoons or other silver utensils have been used for eggs, or have been exposed to gas or any element containing sulphur, they very soon become covered with a black coating of the sulphide of silver. This may most readily be removed by placing the article in contact with a piece of bright metallic zinc, and immersing the two in a boiling saturated solution of borax or caustic potash, in water. They may also be cleaned with a concentrated solution of cyanide of potassium."—(*Ibid.*)

Black Ink.—The *Journ. of Applied Chem.* says: "An excellent black ink can be made at a cost of about three cents per gallon. Dissolve in about four gallons of hot water three ounces of solid extract of logwood; to this add half an ounce of bichromate of potash, dissolved likewise in a little hot water. The ink thus made, though of a purplish blue color at first, dries black, does not corrode steel pens, and does not fade."

Mica Spectacles.—"As a substitute for the ordinary crystals or glasses of the spectacles worn by workmen in various trades to protect their eyes from injury by the glare of heated masses or flying particles, it has been proposed to use mica, as being less liable to injury or breakage and as affording a softer or more agreeable protection to the eyes."—(*American Artisan.*)

"*Drilled* vs. *Punched Holes.*—A large number of specimens of steel plates were recently tested at Chatham Dockyard, to determine the difference in strength between steel plates with punched and drilled holes. Although the pieces were so prepared that they should break at the smallest part, they all, without exception, fractured at a place where two small holes had been punched. But when the holes were drilled, and in the largest sectional area of the steel, they as uniformly broke in the smallest part, exactly the reverse of the previous trial. From this and other experiments the advantage in tensile strain, gained when the holes are drilled rather than punched, was calculated to be 22·5 per cent."—(*Sci. Amer.*)

"*Tenacity of Metals.*—Guyton Morveau has carefully determined the weight which can be supported by wires of a uniform diameter of 0787 of an English line without fracture.

Metals.	*Pounds.*	*Metals.*	*Pounds.*
Iron	549·250	Gold	150·654
Copper	302·278	Zinc	109·540
Platinum	274·320	Tin	84·630
Silver	187·137	Lead	27·621

(*Boston Journ. of Chem.*)

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ORIGINAL COMMUNICATIONS.

NITROUS OXIDE IN ENGLAND.

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It is somewhat surprising—if not, indeed, amusing—to observe by the English medical and dental journals, that the recent introduction of this agent as an anæsthetic to the dental profession of England (first by Dr. W. H. Waite, of Liverpool, in a lecture before a chemical society of that city, and subsequently by Dr. Thomas W. Evans, of Paris, the latter not only visiting London expressly for that purpose, and demonstrating its applicability on various occasions, but in addition very liberally presenting to the Dental Hospital of London "one hundred pounds [$500], to be used for the purchase of apparatus and materials to manufacture nitrous oxide gas," so that the agent might be thoroughly tested in that institution) has met with the most decided opposition on the part of a number of medical writers. The most prominent among these is Dr. B. Ward Richardson, well known as the discoverer of local anæsthesia by means of the ethereal spray, whose name has been frequently referred to in the most favorable manner in this magazine by the writer. Had this gentleman restricted himself to animadversions of the indiscriminate use of nitrous oxide on the part of ignorant and unprincipled persons (who have not only removed thousands of teeth which might have been saved for many years of valuable service, but in addition have placed the lives of those who have come under their hands in jeopardy, by using a potent remedy of whose composition they knew nothing, and therefore as likely to employ an impure as a pure article, and in cases of impending death from its employment would be unprepared to meet such an emergency with any prospect of saving the life of the patient), there would have been much propriety in his objections. When, however, employing such strong language as the following (in italics), he in-

dicates not only strong prejudice, but in addition a want of familiarity with its employment as an anæsthetic in the practice of surgery. At a recent meeting of the Medical Society of London, as reported in the *Lancet*, he remarked: "It was painful to see the childish excitement with which nitrous oxide and its effects had recently been dwelt upon. The gas had been treated as an unknown, wonderful, and perfectly harmless agent; whereas, in simple fact, it was one of the best known, least wonderful, *and most dangerous of all the substances that had been applied for the production of general anæsthesia.* No substance had been physiologically studied with greater scientific zeal or more rigid accuracy, *and no substance had been more deservedly given up as unfit and unsafe for use. It had caused death in the human subject*, and on animals it was so fatal that, with the utmost delicacy in its use, it was a critical task thoroughly to narcotize an animal with the gas without actually destroying life." What the mortality attendant upon its use may have been abroad I know not, and any cases reported there have not come under my notice. In this country, notwithstanding the thousands of times which it has been and still is employed (too often, alas! as already stated, administered by the most ignorant quacks), but two fatal cases have occurred: in the first of which an autopsy revealed the fact that the lungs of the patient were perfectly riddled with tubercles, and in the second case death was caused by swallowing a cork placed between the teeth to keep the jaws open. This speaks volumes in support of the fact that of all anæsthetic agents this is evidently the least dangerous which can be used. With respect to its employment in connection with animals, having had no opportunities of observing its administration under such circumstances, I am unable to say anything; but the reference to them reminds me of a peculiar exhibition I witnessed when a student at the Jefferson Medical College, some twenty years ago. A much respected and deservedly eminent obstetric teacher, Prof. Charles D. Meigs, who had conceived a very strong prejudice against sulphuric ether, particularly in obstetric practice (and who frequently asserted that the pains of labor which a mother bore made her love her child the more, and that an obliteration of such suffering by anæsthetics would have a tendency to lessen maternal affection), informed the class one day that he would demonstrate to the students what a very dangerous agent sulphuric ether was, by administering it in their presence to some animals. An old sheep and a lamb were accordingly brought into the lecture-room, and after considerable trouble, the expenditure of much time, and by *cutting off the supply of atmospheric air entirely*, the young animal died, but the old one most obstinately and pertinaciously refused to do so, although most decided efforts were made by the attendants to induce suffocation, and continued for an hour and a half, when at last it was decided to let the poor creature alone. Notwithstanding the large

amount of ether used, and the improper administration, the animal did not appear particularly affected by it.

It is a matter of regret, for Dr. Richardson's own sake, that he should have assumed such a decided opposition to an agent which, in this country, has been employed with advantage, not only in minor surgery, but also in numerous capital operations. It looks very much indeed as if his judgment had been warped by a too fond regard for local anæsthesia. The experience acquired by him in connection with his observations on the coagulation of the blood should have induced more discretion than is manifested by the espousal of such a cause as opposition to the use of nitrous oxide. In the case referred to, after writing a most elaborate and apparently exhaustive work on the "COAGULATION OF THE BLOOD" (*the Sir Astley Cooper Prize Essay for* 1856), wherein it is stated most emphatically, as the result of carefully conducted and frequently repeated experiments, that the coagulation of the blood is due to the escape of ammonia, he has said during the past year, with an honesty worthy of commendation and imitation, in a brief paragraph, that a more extended experience has convinced him that the conclusions then arrived at were erroneous and untenable. That he will sooner or later recognize his present position with respect to nitrous oxide is equally so, is fair to infer.

THE MICROSCOPY OF THE LIVING TISSUES.

BY PROF. RUFUS KING BROWNE, NEW YORK CITY.

(Continued from page 345.)

LET us take an example of the building up of a compound tissue, in order to illustrate the process of the changes and transformations which take place in the formative elements, in the building up of all the tissues of whatever name, in a compound organism.

Let us select the "connective" tissue, which has been the subject of a host of researches. Up to the time of Virchow, it was understood and regarded as the least functionally important tissue in the body,—being considered as serving a kind of inert mechanical purpose. But in reality it has been shown, not only to be of great consequence in binding, by its peculiar ramifications through their interior, the elements of the various organs together, but also to give nativity, by the formative or "germinal" power of its cell elements, to all new or pathological growths in tumors, etc. The genesis of this tissue is by the transformation of the "units," or cell elements, or germinal masses. These commence their formative career as a collection of minute germinal masses or "cells," which have increased from a few primitive ones by division. These are at first in exact contact. Between them, however, as the developmental process goes on, a variable amount of nearly diffluent semifluid or solid intercellular substance or matrix arises.

The cells or germinal masses continue to multiply in number by division, the intercellular being also increased in quantity and density. The "unitary" or germinal masses may remain irregularly round or oval, growing to a variable size, and presenting some variations in the character of their substance. Some become branched and stellate, the processes extending and connecting at every angle with each other, forming net-work; and some extend into long fibres, in which, although they have derived their substance from that of the germinal masses, and are indeed only the final drawn-out shape of these masses, yet show no appearance of a cellular early state. This tissue, the true connective tissue, can be found throughout every organ of the body, even in the kidneys and brain, where its fine anastomosing net-work can be seen with proper preparation. It consists of cells or "unitary" masses still united, and forming a net-work by very fine thread-like or filamentous portions, which are simply the extension in every direction of the substance of the formative masses, which still abide under their own shape. The generally received description of the formation of this tissue is, that the cells commence the process by assuming an elongated form; then send out branching processes which join themselves to similar prolongations of adjacent cells. But in reality no such process takes place. The cells at first resulting from division lie in contact. As the masses separate and diverge in different lines from their once common centre, they are still held in bonds of cohesion by exceedingly fine prolongations or lengthenings out of their very substance. This divergence or separation occurs during growth, and hence they continue to add new substance, atom by atom, to keep up their integrity as germinal masses, even while they are being converted in part into fibres, the fibres being only the thread-like portion of the cellular masses, and identical with them by perfect continuity of structure.

Seeing, then, that the microscope is the all-sufficient means for ascertaining the mechanism of the various parts of the organism which perform functions, it becomes an indispensable instrumentality to every professional man dealing with these parts in health and disease. Many, and perhaps eventually all, of the defects in our knowledge could be readily supplied by the systematic use of the microscope. And, indeed, how otherwise than by this mode of research and observation can we expect to *know* any part of our organisms, or any part of the functions they perform? Perhaps scarcely a real novel observation upon the animal tissues can be made by the microscope which will not be found to have some direct bearing upon the physiology or pathology of man. This truth needs to be enforced upon the lagging comprehension of professional men, because experience has shown that many of them ignore the palpable defects in our knowledge of the most important of transactions in the organism, apparently under the impression that by doing so they conceal their ignorance.

But how is it possible for us to obtain even a glimpse of the true nature of many processes which we instinctively suppose to have their origin in perturbation, derangement, or disturbance of the movement of the blood, for instance, without first ascertaining what the exact character of that movement is? Or how, for example again, is it possible for us to gain any reliable knowledge concerning the nature of many of the most important healthy nervous actions, or the most ordinary nervous diseases, until we have ascertained the fundamental management and relations of a nerve apparatus? Or how shall we really understand any of the morbid phenomena connected with various states of dentine, unless we have ascertained what the anatomical character of the tissues which exhibit these phenomena is?

All the contradictory and in some cases absurd theories which exist upon these points are only an effort of the professional mind, in the person of its most active-minded representatives, to endue itself, in the destitution of real knowledge, with some fanciful or imagined substitute. Take, for example, the case of the formation and form of characters of dentine, which consists in great part of innumerable tubes whose walls are firmly calcareous. Mr. Tomes early declared the hollow within these walls to contain at any moment of life a "nutrient fluid," involving the mistaken theory that, after the formation of the tooth, it wasted and was constantly supplied with nutriment. But afterward, proper examination with the microscope showed him that these tubuli are not fluid-occupied hollows, but are filled with a firm, soft-solid, fibril-like substance. These are in reality bodies which are the immediate agents in calcification. Further examination by the microscope of the same tissue shows us some of the other characters of the structure, and leaves no room for doubt as to the origin of the morbid changes to which it is liable.

A description of these several points will form the subject of our next paper. Much more is actually known than we think usually appears in the current literature of dentistry. The early observers used low powers of the instrument, and with high powers much of their work was superseded, and nothing can possibly be gained for the progress of dental art by ignoring this great difference.

ALUMINIUM AS COMPARED WITH OTHER MATERIALS FOR DENTAL PLATES.

BY DR. SAM. LAWRENCE, LOWELL, MASS.

Any one material for dental plates must depend for its rank among the different materials used for that purpose upon its capability to resist the action of the acids and alkalies of the mouth; the facility with which it may be worked and fitted in all its parts; its strength and durability.

As much is due to the workmanship of any material, in its value to the patient, as to the material used. A plate carelessly put together upon the best material is really not of so much value to the patient as one well made upon a poorer quality of base or metal. The cheapness of some materials, the small amount of skill required to construct a dental plate, and the ease with which it is accomplished, has led many of our profession to recommend to their patients in some instances that which their better judgment ought to direct otherwise.

Aluminium is a new metal for dental plates, and its true merits have not been thoroughly tested. It is never found in its virgin or native state as a metal, but is manufactured, and of materials so common as to give promise to be at no distant day one of the most plentiful as well as one of the most useful metals. It is composed of clay, prussiate of potassa, and common salt. The clay is well saturated with sulphuric acid to remove the iron, then dried and mixed with twice its weight of prussiate of potassa, and this must be increased or diminished according to the amount of silica in the clay; add to this common salt one and a half times the weight of clay; then heat the materials to a white heat, so as to fuse well, and you produce aluminium.

From these minerals you produce a metal that is light, ductile, and near the color of tin or silver. It is very malleable, and may be hammered or rolled into very thin sheets of almost any form; and with care can be struck up for dental plates with as much ease as a silver plate. But here we meet with a difficulty which no one has yet been able to overcome, and that is, to produce a metal, or a combination of metals, of a like nature, or rather a hard metal, in the form of solder or cement, by which to fasten the teeth upon the plate. Another method of constructing dental plates is by a process patented by Dr. James B. Bean, of Baltimore, which consists of three rights: first, on making allowance for shrinkage of the metal when cast; second, on apparatus for casting; and third, on fastening the teeth to the plate. To work it according to Dr. Bean's patent, a plate is very nicely produced, and is pretty sure to fit the mouth. But there is much of the process which occupies so much time that, if this is the only way it can be worked, it will be a long time before it can be brought into general use. It requires more skill than vulcanite, and indifference in manipulation shows its marks very plainly. Much of the process patented by Dr. Bean is entirely useless—a waste of time; and this very complicity has a tendency to keep it from general use in the practice of dentistry. I would say to the profession that aluminium may be worked as easily as ordinary keoplastic, with one or two exceptions. Objections have been raised that it will not pour, but this is a mistaken notion. Experience has taught me that it pours as sharp as almost any other metal. If any one should have any difficulty, let him add a little carbonate of soda while melting.

And now, while upon this point, I may as well give my own process, for which I claim no patent, but only hope that the profession will give it a fair trial. Their success is all the remuneration that I ask. To begin, I take the impression in the ordinary way in plaster; coat this evenly with collodion; then oil; mix plaster and common sea-sand—pure silex I think would be better, such as jewelers use in scouring—about equal parts in bulk; add a little pulverized pumice-stone, and pour into the impression, shaking well down. Now you have the male model, and the very one upon which you are to cast. A gutta-percha or wax try-plate is fitted to this, or it may be fitted to the plaster one, by taking two models. Take the articulation; fit up the teeth in the same manner as vulcanite, only do not let the wax go over the edge of the gum, unless it is thick, as there is liability to break the teeth in the shrinkage. But for single or plain teeth, fit them the same as for rubber or ordinary keoplastic. Then, having the case ready to bed, have a flask with two apertures on the top at the back part. Then bed, using the same material as in the male cast; then dry and heat gradually to a red heat; insert the tubes of from four to six inches long in the apertures, and pour quickly until the metal rises in the opposite tube, and the job is done. It may be finished as highly as silver, but it will not take nor retain so fine a polish.

The value of this metal has not had a fair test as yet, for various reasons. One is, that it is supposed that it can be worked only by the patent of Dr. Bean. Another is, the expense of getting the necessary instruction and the apparatus. And still more, it requires more skill and care than vulcanite. One important point in its use is, will it stand the acids and alkalies of the mouth? In my judgment, it will as well as silver, and I think better. No patent can cover the process I have described, and it is more readily and easily worked, and is also a great saving of time, although it must be worked with care. And here let me say that dentists generally are too careless, and I might say slovenly, in their manipulations in the manufacture of plates. This is attested almost every day by witnessing the rough, bungling workmanship, which would be no credit to any one in the early stages of studentship, especially upon the vulcanite.

Gold of a fine quality is, without doubt, the best material yet known upon which to insert artificial dentures. First, because it has stood the test for years in practical use; and second, we know it will resist the action of the secretions of the mouth; it is also a good conductor, and consequently can be worn with more ease and comfort to the patient than any material of the same thickness.

As to cleanliness, much depends upon the wearer; yet from the looseness with which some of this work is put together, any one would think it was intended for fly-traps.

The cost of the material seems to be the most serious objection which is raised, and that mostly by dentists who do not understand working anything but vulcanite, and that but indifferently. There are those who desire the best class of work on the best material; and I consider it the duty of the dentist to so recommend, to furnish and fit a plate, that he will not be ashamed to see it a second time. I consider gold the best, if we can have but one material; and if we cannot bring the patient and profession up to the highest standard, let us strive for the best thing under the circumstances.

Platina will come next, and what I have said of gold is equally true of this metal; and it should be more extensively used, because it is, in fact, when nicely and properly done, the most cleanly of any of the different materials now in use.

Silver has been used to a large extent, and, with the exception of corroding in some mouths, has answered a good purpose. This can be obviated to a great degree by a proper attention to cleanliness on the part of the patient. This action upon the plate plainly shows a derangement of the stomach, some disease of the salivary ducts or glands, and indicates that the proper remedy is medical treatment.

Rubber answers a good purpose for temporary work, and in many cases for permanent sets. But its indiscriminate use for every kind of plate, as is practiced by some dentists, is a disgrace to them, and an imposition and injustice to the patient.

What can be done with rubber can be done with aluminium, silver, or gold. Many dentists have told me that they had not set a tooth on anything else for six or eight years, and what is more, some cannot work anything else. And this very lack of knowledge and skill to work the different materials best suited to each individual case is humiliating in the extreme to every high-minded practitioner of the dental profession. This very thing, *rubber*, has brought many into practice who have not brains nor mechanical skill enough to work anything that cannot be whittled like a piece of wood.

In many cases, as I have said, it is a good thing, and, for those that cannot afford better, it may be used; but there are many objections to it which must be overcome, and will be perhaps in time. Its cheapness, and the ease with which it is worked, are what recommend it at the present time. It is so little expense to set up shop with this material, and so little knowledge is required, that it is not uncommon to see a sign out with "Dr. So-and-so, Surgeon Dentist," saying to the public: "Those in want of teeth are requested to call on Dr. So-and-so, where they can obtain the most beautiful set in the country, a perfect fit, in the best style of workmanship, for ten dollars." Again, there are persons who go into offices for teeth, and desire the best material, and will say to the dentist, "Well, I had thought of having my teeth on gold; don't

you think it is the best?" The answer is, "Oh, undoubtedly it is, but almost everybody is having rubber now, and I can make you a set with that for one-half what it would cost you on gold." And further, they will say, "I have set quite a number where they have worn gold, and they like them better." What does this prove? Not that gold is not the best, but that rubber is much easier and quicker put up, and gives the dentist a large amount of work with but little money. Is this right? Is this our duty to ourselves, to the patient, and the public? Is it not rather our duty to the unfortunate and to ourselves to recommend, at least, the best thing under the circumstances? In this day of dental colleges and other means of instruction, is it not our fault if we do not thoroughly understand our science, and be able to go before the public confident of our ability and skill to perform all operations pertaining to our profession satisfactorily to all reasonable minds?

At this day of knowledge and experience, when the spirit of inquiry is abroad in our land, and, I might say, all over the world, I cannot but anticipate a period when malpractices shall be arrested, and the darkness of ignorance dispelled, and our profession take rank where it belongs.

Although it is of great consequence that every dentist should thoroughly understand the process of constructing—and thus securing to the patient—artificial teeth, it is of much more vital importance that he should know how to preserve the living ones. It is the impression of many minds, that the loss of the teeth is a necessary consequence of advanced age; or, if young, that it is owing to some accident or malpractice in the use of medicine. But how shall we determine these points? I know of no other way than by a knowledge of the collateral branches of medicine. To prove this, we have only to refer to the frequent occurrence of those affections of the dental organs which arise from some gastric or constitutional irritation and disease. The frequent occurrence of these cases in our practice must convince any one that he should adopt an extensive range of study. This is essential to the accomplished practitioner, for he must not forget that morbid action or disease in other parts of the body gives rise to diseases of the teeth; that diseases of these organs have a reciprocal action, producing affections of the eye, the ear, and the stomach.

Thus, then, aided by a knowledge of the anatomy and pathology of the parts, and, at least, some knowledge of medicine, we shall be able to successfully treat those diseases and affections that legitimately belong to dental practice; and, aided by our skill also in preserving the natural teeth, lessen the necessity for artificial ones.

FIRST PERMANENT MOLARS.

BY DR. E. H. KILBOURNE, AURORA, ILLINOIS.

Read before the Illinois Dental Association.

My time of late has been so fully occupied by professional and other duties, that I have had no time to prepare any lengthy or very well digested treatise upon any subject connected with our profession. I will, however, offer a few remarks on a subject which I am convinced is seldom if ever appreciated and acted upon by the mass of our patients, and I fear, in many cases, by dentists themselves. I allude to the treatment of the first permanent molars of children. It is an everyday experience with dentists of any extended practice that they are called upon to extract these teeth on account of the pain experienced from them by the possessors. How frequently are these little ones, ranging from six to ten years of age, brought into our offices by their parents, suffering with pain incident to the exposure of the nerves of these teeth, which, of course, being perfectly firm in the jaw, cannot be removed (except under the influence of anæsthetics, which often the parent is opposed to) without giving a deal of pain! How often are our sympathies tried to their very depths at the prospect of the suffering we must necessarily inflict on the little patient! To an operator possessed of humane feelings, this is one of the most painful duties he is called upon to perform; but do it he must, and the little lamb for the slaughter is lifted into the chair; the little meek to-be-sufferer looks up into your face with all the trusting confidence incident to innocent childhood, which says as plainly as words can speak it, "I know you won't hurt me." But alas! the operator knows too well the disappointment awaiting him! How often in our hearts do we wish that the thoughtless parent might endure the pain we are obliged to inflict upon his innocent child in consequence of his (the parent's) criminal neglect or stupid and inexcusable ignorance!—for we can designate it by no milder term. When reproached for his carelessness, and asked why he suffered the child to go thus far without the attention which should have been bestowed, the usual reply is: "Why, you would not fill the first set of teeth, would you?" "But these are the second set," you reply. "Oh no!" he says, "the child has never had any pulled where these are, and they cannot be the second set." But after some argument on the point, we convince him of his erroneous views. "If I had known that, I should have had the child's teeth attended to before." But his repentance and good resolutions for the future come too late; the mischief is done, and all we can do is to make the best of it. These are scenes of almost daily occurrence in the practice of every dentist. It is, in fact, well known to every dental student that these teeth make their appearance at the age of from six to ten years, and many times, owing to deficient nutrition,

an imperfect formation of the enamel, or some other abnormal development incident to a vitiated state of vital force, so subtle in their nature as to defy all analysis or control, the early destruction of the organ is consummated unless arrested by the combined skill of the dentist and vigilant watchfulness and care of the parent. Now, under these circumstances, what can be done to arrest this wholesale slaughter? Some experts may say that if a case presents itself like the one described, he should destroy and extirpate the nerve of the tooth, and then plug it. Admit the practicability of doing this successfully, which we doubt, especially in a case where the patient is not over ten years of age, and the reasons for this doubt will be perfectly obvious to any dentist of any considerable practice; but, I say, admitting that the skill of the operator could compass the ends, there is one barrier which we cannot overcome, viz.: the disposition and inability of the parent to incur the expense incident to an operation of that kind. Very few of the mass of people can avail themselves, therefore, of these aids. The only alternative, of course, is the extraction of the tooth, whereby a valuable organ is irretrievably lost, the inconvenience of which is felt through life. The responsibility of this untoward result lies wholly with the parents of the child; they are not informed on this subject, as well as on a great many other matters which ultimately concern their children's highest welfare. Their ignorance is in a measure excusable, but not wholly so, for if they were as much concerned for their children's happiness and well-being in this respect as they are for many other things which affect their material interest, information would be obtained from some source or other and acted upon; they would take their children to some reliable dentist and have an inspection of their mouths, that any abnormal development might be corrected before it was too late; but how seldom is this done? A culpable carelessness and indifference seems to pervade almost the entire mass of people, whereas the care of their own and their children's teeth should engage their constant attention. I said that their ignorance was in a measure excusable; but in admitting this, we must reflect somewhat upon the dental profession itself. There has not been any very extended or systematic effort to spread this information among the people in an available and practicable manner. This, we are inclined to believe, can and ought to be done, and it is with a view to bringing this subject before this meeting that has suggested the remarks just made. In pursuance of this, I would suggest the propriety of this Association's appointing a committee to prepare an article upon this subject for general publication, and submit it to the Association at our next meeting, when, if approved of, it be indorsed officially by them, and sent to the principal newspapers and public journals through the State, with the request that they lay it before their readers, not as an advertisement for dentists, but *pro bono publico.*

FORMATION OF DENTINE.

BY PROF. RUFUS KING BROWNE, NEW YORK.

In a recent number of this journal there appeared an account of the mode of formation of dentine as supposed by Czermak and others, which was adduced as that by which the embodiment of the contour lines is accounted for. This account is, in brief, that globules of the lime compound of dentine advance along the tubes, and subsequently coalesce. And the supposed explanation of contour lines, which we pronounced our assent to, existed in the coming together and condition of these globules,—the contour lines being in the completed stage, the outlines of the globules arising from them not actually fusing.

But further consideration has led us to believe that this was a misapprehension of the case. For, in case the contour lines were formed in this way, not only that portion of the outline of the globules running in one direction, but in a second or more directions, would be equally formed, and from this source of formation of the lines a certain portion of the outline would conjoin in nearly a right angle of direction to the former. This mode of formation of them would result in contour lines in a direction not merely transverse to the direction of the "tubes," but also in a direction nearly parallel to them; and the contour lines as they at present appear would be continuous, with lines of the same origin and characters following an *additional* course at right angles to them.

These conclusions in the course of their formation may seem to take a different character, from the supposition that the side of the globule, in the proceeding of coalition with others in advance of it—although between these there is no actual fusion or obliteration of the parts of their outline which come against each other (from which incident obtains the contour lines)—may, however, in the other part and direction of their surface against the sides of the tubes, fuse so closely therewith as to permit no appearance of the line of junction to appear.

But, on continued reflection, it would appear that the opposing sides in part of two globules must adjoin somewhere in the intertubular space; for, as each globule advances as a spheroidal belt surrounding a tube, at least one portion of the side of two globules must come together between; thus giving rise to lines formed by that junction—some modification of a parallel to the direction of the tubes—that is, a direction beside that of the contour lines.

But, still further, the nature of the experiment reported in the account of formation of dentine by lime globules, and adduced as incidental evidence, which explains the mode of formation of contour lines, seems, on closer consideration, to fail of that character of testimony. On the contrary, it seems, after unbiased consideration, rather to furnish *col-*

lateral evidence of the improbability of this theory of formation of dentine. Let our readers look at this closely.

In the experiment with acid, it is supposed to obliterate the globular form, by its well-known effect of *dissolving* lime formations. But if these globules *are* globules of lime, it must be of that substance already in *solution.*

Can it be, in the nature of the case, lime in an amorphous, or granular, or any other deposited or sedimentary state, in a spheroidal or roundish shape? In other words, can it be lime in a solid condition?

The question is not only pertinent, but much more; the whole of the probability or improbability of the formation of dentine by globules of lime turns upon it.

If the acid exerts the dissolving action upon lime attributed to it, leading to the inferences incidentally drawn from it, these globules are of lime in a solid state; either in a solid state as a single concretion of particles, or as particles not actually concreted in a single mass.

But, in either case, equally solid they must be in order to be solved as supposed by the acid. If it be otherwise—if they be not solid lime—there is no solving action, the compound of lime being already in solution. In that case, the globule is altogether of fluid consistency—*is* a globule of a solution.

Between these we have to choose. If the latter is the case, then the alleged action of the acid is an illusion, for the actual effect they have is not one on a globule of lime in solution.

Conversely, if the globule is simply a solid shape of lime—in which case alone can the acid have a dissolving effect upon it—then we must regard these globules as already *formative elements,* which build up the dentine; not, mind you, in this case mere primitive substance, but substance in compound already anatomically arranged or formed, and needing only subsequent coming together, in the way this theory of formation supposes, to complete the structure of dentine.

Leaving out of consideration here the intrinsic difficulties involved in the mode of their becoming amassed (for which we refer our readers to a recent report of the transactions of the New York Odontological Society), we may ask if lime in this state is in the state embodied in the construction of a tooth? The answer of any person, we think, who has the slightest knowledge in the case would be in the negative.

In giving this answer, we might freely confess our want of knowledge of how the tooth is made up; but this confession would only be a testimony that it was *probably not* made by accretion in this way.

Any subsequent change in state the lime might be supposed to undergo could not *post-date* this amassing of globules, nor alter the mode of building up which it supposes. Moreover, this mode of formation assumes the existence and even arrangement of the dentinal tubes as

already in being. And herein we recognize what, to us, is the familiar fallacy, that the early proceeding in forming the tooth is that of the laying down of these tubes.

This fallacy of observation arises from the old notion of a nutrient, fluid-bearing system of pipes. The same notion is involved in the theory of the formation of dentine erected upon the perception of the interglobular spaces.

We wish our readers to appreciate that we are far from being disposed (certainly not habitually so disposed) to impugn any reasonable theory of the formation of dentine, but we are quite as much indisposed to accept any which presents features of a contrary character.

We are perfectly willing to confess on our part an almost entire ignorance of the mode of formation of the teeth. The thing to be deplored is that which we are almost all ignorant of. Those who are most ignorant—and, more than this, least intelligent—conceive themselves to *know*, in virtue of their wholly unsubdued faculty of saying they know, when they know little or nothing about it.

ON THE CAUSES OF VULCANIZERS EXPLODING.

BY R. C. MOWBRAY, WARSAW, ILL.

Number five of the present volume of the Dental Cosmos contains a short article upon this subject. Having used two of Dr. Whitney's No. 2 Vulcanizers for several years, I have a high opinion of them; I admire the machine for the unform result which is invariably produced by giving it the proper attention. The writer of the article mentioned said he had been in the habit of heating his vulcanizer up "to 340° and 350° for half an hour," but he does not tell us why he does it; if it is to vulcanize a rubber plate, it would surely make the longest-faced member of the profession "smile."

It is apparent, vulcanizing at such a high heat fails to produce the best results. After vulcanizing at every point from 310° to 330°, I conclude that from 315° to 320° will invariably produce the best plates, both in color and durability. Rubber, hardened at 330°, is brittle; it lacks toughness and strength, hence it cannot be compared to plates made at a lower heat.

Dr. Whitney, in his circular sent out with his vulcanizer, tells us that "the soft solder plug in the top will blow out at about 370°, acting as a safety-valve in cases of neglect."

I recently neglected my vulcanizer for "one minute," to extract a tooth for a patient, the thermometer having remained at 320° for nearly thirty minutes previous, needing no change in the flame during that time. I returned, I think, inside of three minutes, and the thermometer stood at 380°—the soft plug not out! I blew out the flame,

and took French leave at the rate of forty miles an hour. Had my vulcanizer exploded during my absence, would it have been the fault of the machine? The thermometer is new, and I believe accurate.

A vulcanizer free from defects, when in constant use only six months, if used with a moderate degree of care, cannot be sufficiently weakened to be dangerous. Probably the greatest cause of vulcanizers exploding *is a defective thermometer*. When the bulb cracks, the thermometer can no longer be considered reliable. The bulb should be examined occasionally with the microscope. A common microscope will readily reveal its true condition.

Without doubt, nine-tenths of vulcanizer explosions may be attributed to neglect in examining thermometers. How often thermometers need this attention, of course depends upon the kind of glass they are made of, and the number of times they are used. Any one experienced with the use of a vulcanizer knows how sensitive a new thermometer is, and that it needs constant attention; how much more care should be bestowed upon those that have been in use a long time, and are slow to indicate the temperature!

Considering the large number of vulcanizers in use, and the manner in which they are often neglected, it must be admitted that cases of explosion are comparatively rare.

The gentleman of Philadelphia does not tell us his thermometer was new and reliable, or that the vulcanizer was constantly watched; and, inasmuch as a dentist's "minute" is not confined to sixty seconds, and as he lives to tell us of the accident, the natural inference is that the sensitive vulcanizer was offended at his absence and neglect.

MORPHIA IN SENSITIVE DENTINE.

BY JAMES S. SNOW, MADISON, FLORIDA.

In the April number of the Dental Cosmos, Dr. Mowbray, of Warsaw, Ill., in descanting on the use of morphia as a remedy for sensitive dentine, recommends the use of it internally instead of applying it to the cavity to be operated on. While I agree with the doctor that (with the majority of patients) his plan will put us on the "safe side," so far as to obtain the desired end, I beg leave to differ with him as to the use of the remedy as indicated by him; and we are led to the inference by his statement that—his experience has been far more happy than that of any one else—he makes no exceptions to the use of the remedy in the manner indicated, but states that he "has no difficulty in filling sensitive cavities, and as many of them as circumstances may indicate."

Does he never meet with cases where the administration of morphia in doses of one-tenth to one-fourth of a grain, *internally*, will not obtund sensitiveness of the tooth? when, instead of having this effect, it makes the patient much more sensible to pain? where even one-tenth

of a grain shocks the system to such an extent as to entirely suspend digestion for over twenty-four hours? Let me cite a couple of instances in my limited experience.

November, 1867.—I was so unfortunate as to be compelled to destroy the nerve of one of my own teeth—not to allay sensitive dentine. I applied morphia and arsenic for this purpose, when the pain became so intense, that to obtain relief I took one-eighth of a grain of morphia; the consequence was, that in getting rid of one trouble I got into another, and was totally unfit for any business for over thirty-six hours.

April, 1868.—Called on to fill a tooth for Mrs. W. In excavating, exposed nerve; applied morphia and arsenic to destroy the nerve; in a few minutes pain became very severe; proposed to administer morphia; patient objected, on the ground of unpleasant effects. I then applied ten drops solution of morphia under the skin with syringe, inserting it a little behind the ear; it took effect in ten minutes—but not such as was hoped for; the patient got no relief from the pain, and was rendered so nervous and sensitive as not to be able to rest till the effect of the morphia had entirely subsided; nor did the pain abate for over twelve hours—the morphia and arsenic remaining in the tooth forty-eight hours.

How will Dr. M. treat such cases as these, where the patients cannot take morphia without such unpleasant consequences?

REPLACEMENT AND REUNION OF LOST TEETH.

BY H. T. FOGG, SAO PAULO, BRAZIL.

On the 25th of February last, a young man came to me with his two upper front incisors knocked out by a fall, requesting me to give him something to stop the bleeding. This was about two hours after it happened. On examining the mouth, I found no other harm done, with the exception of a slight bruise on the chin and upper lip. I determined to replace the teeth, and, after washing them in warm water, easily did so, with scarcely any pain to the young man; but they dropped out again immediately. It was about ten o'clock at night, and too late to arrange such ligatures as I could then think of. I took a piece of pure gutta-percha, softened it so that it would work easily, pressed it around the upper front teeth, covering them inside and out, then ordering him to close his jaws, covered the lower incisors also; tied a handkerchief around under the jaw and over the head, and told him to go home and go to bed, and not to open his mouth until I called upon him the following morning, when I took away carefully the gutta-percha, and found the teeth fast, but very shaky. I then tied them to the other teeth with a piece of silk twist, carrying the ligature as far back as the first bicuspid on both sides, ordering him to use an astringent

wash frequently. The teeth remained in this way until the 13th of March, when I took off the ligature altogether, and twenty days after found both teeth as firm in their places as their immediate neighbors, or any of the others, and to all appearance the same as if they had never been out of their sockets—so much so, that I filed off the cutting edges of the right one, it being a little longer than the left. They continue so up to the present time, not having even changed color.

I attribute the success of this case in a great measure to the *fixture* of gutta-percha, and the patient's keeping it in place until I saw him, about ten hours afterwards.

The young man is a student at the college here, and is about seventeen years of age.

ALUMINIUM BASE.

BY H. BERHARD, D.D.S., NEW YORK.

THE objections heretofore entertained in reference to aluminium work have been, I think, entirely obviated by the recently-employed solder of Dr. Starr. I have been using it for some time with perfect success, and find that the employment of this solder renders the use of aluminium as a base for artificial teeth in every way practicable and lasting, and in every respect superior to rubber. The solder is a composition of aluminium and tin, the latter metal being almost entirely withdrawn while soldering, thus forming an almost uniform connection of aluminium itself. Bases made of this metal will not discolor, being in no wise affected by the acids of the mouth.

I have seen work in use for eight or ten months, which appear as bright as when first inserted. I find, in partial cases, for single teeth, that long-pin teeth are necessary. A little patience and practice in the use of Dr. Starr's solder, and careful manipulations therewith, are all the necessaries for the perfect success of the use of the base, which I doubt not will in time supersede the rubber entirely.

PROCEEDINGS OF DENTAL SOCIETIES.

MINUTES OF PROCEEDINGS OF THE FOURTEENTH ANNUAL MEETING OF THE AMERICAN DENTAL CONVENTION.

BY J. S. LATIMER, D.D.S., NEW YORK.

THE Convention met in the Cooper Union, New York City, on the morning of June 2d, 1868. President J. G. Ambler in the chair.

J. S. Latimer was requested to act as Secretary *pro tem.*

J. H. Smith, C. E. Latimer, and W. H. Atkinson were appointed a committee of arrangements.

After a brief conference, the committee announced that they deemed an initiation fee of one dollar quite sufficient to meet present wants.

The Treasurer, Dr. J. H. Smith, reported that to date he had received $73.80, and paid out $34.80, leaving on hand $39.00.

He also held the report of H. Benedict, the former Treasurer, who acknowledged an indebtedness of $88.02.

The report was accepted and adopted. Sixteen gentlemen then became members on paying the fee of one dollar each.

On motion, the Convention adjourned to meet in Room 24 of the same building, at 8 o'clock in the evening.

Evening Session.

According to adjournment, the American Dental Convention assembled at Room 24, Cooper Union, at 8 o'clock.

President J. G. Ambler in the chair.

G. A. Mills was made Secretary *pro tem.*

The Committee of Arrangements reported the following subjects for discussion:

1. Improvements in Artificial Dentures.
2. Dental Education.
3. Absorption and Reproduction of Alveolar Processes.
4. Improvements in Operative Dentistry.
5. Miscellaneous Subjects.

Adopted.

Invitations from the President of Bellevue Hospital, and from the Commissioners of Public Charities, to visit the institutions under their charge, were accepted with thanks.

The first subject reported by the committee being declared in order, J. A. McClelland, of Louisville, Ky., patentee of the "Rose-Pearl" (collodion) base, presented the merits of his patent, and stated the terms on which he proposed to grant its benefits to the profession. He claimed that his material was twice as strong as vulcanite, withstands the action of acids, and may be nicely adapted to the mouth. Plain teeth are employed, as the color of the base is a near approximation to that of the natural gums.

J. B. Rich hoped that gentlemen who brought their improvements before this body would keep back nothing with reference to them; we could not judge of their merits without a full knowledge of all the facts.

Dr. Atkinson spoke in favor of the collodion base. He was wearing a partial plate in his own mouth, with which he was greatly pleased, and he believed it would eventually supersede all other materials for fractional cases.

B. W. Franklin said he had succeeded in producing a solder which

would withstand the action of the fluids of the mouth, and would strongly unite the different portions of aluminium.

The principal improvement he had made with reference to the working of aluminium is in producing the dies.

A hand-piece, or head for receiving the blow in swedging, is made of zinc or brass, and is tinned upon its lower extremity. His die of fusible alloy (lead 15 oz., bismuth 24 oz., and tin 9 oz., answers) is cast in the impression and cooled.

The hand-piece, heated sufficiently to melt the die by contact, is held with its tinned end against the die until melting commences, when the metal is suddenly chilled, leaving the die and hand-piece united. The counter is made by burnishing sheet-lead upon the die until it has taken the form, and then placing it in sand and pouring lead upon it. A blow or two adapts the die and counter to each other with sufficient exactness. He can thus produce the die and counter in twelve minutes. He highly commended the collodion base.

J. B. Newbrough presented "Iodized Rubber," and stated the terms upon which he proposed to dispose of it to the profession. He exbibited specimens of his base.

A. P. Preterre stated that chemically pure zinc made a very good solder for aluminium, and one that is not easily affected by acids. A solder composed of pure zinc ninety parts, and aluminium six parts, is not affected by sulphuret of potassa, and hence does not blacken in the mouth.

A. Starr presented specimens of aluminium base soldered with an alloy patented by himself, and composed of aluminium seven-eighths, and tin one-eighth.

John Allen thought the object and tendency of all the so-called improvements in the mounting of dental substitutes, made within the last few years, was to cheapen rather than to better the work. He thought that for real excellence we had made no improvements on continuous gum and gold work.

In the award of the Paris Exposition, made to him for specimens of the "continuous gum," the statement was made that they were incomparably superior to all others on exhibition.

In making partial cases, he employs S. S. White's plate, which is made of platinum and iridium. This he solders with an alloy of platinum and gold. These plates bear the heat requisite for baking the silicious compound with which he surrounds the teeth and covers the lingual surface of the plate.

The Treasurer was authorized to collect from Dr. H. Benedict, the former Treasurer, the sum of $88.02, which he retains of the Conventions funds.

Adjourned to meet at the same place, the next day, at 10 A.M.

SECOND DAY—*Morning Session.*

The Convention met as per adjournment, on the morning of Wednesday, June 3d. President Ambler in the chair, and J. S. Latimer called to act as Sect'y *pro tem.*

Memoranda of the preceding two meetings read and ordered completed.

Dr. Atkinson moved that the Convention go into election of officers, which was seconded.

W. B. Roberts moved as a substitute, which was accepted by Dr. Atkinson, that when the Convention adjourns, it be *sine die.*

On motion of C. S. Weeks, it was laid on the table.

A motion to proceed to the election of officers was laid on the table, with the understanding that it should be called up in the early part of the evening session.

Adjourned to meet in the same place at 8 P.M.

The following gentlemen paid the fee and became members:

J. H. Smith, W. C. Parks, W. B. Hurd, C. E. Latimer, J. M. Crowell, J. G. Ambler, J. S. Latimer, Wm. H. Atkinson, V. Pressler, S. E. Arms, C. H. Keech, W. H. Barnum, F. H. Clark, A. Preterre, A. Starr, S. Lounsberry, E. L. Childs, C. D. Cook, G. H. Perine, J. B. Rich, B. W. Franklin, J. A. McClelland, O. A. Jarvis, A. S. Paddock, T. C. Royce, L. S. Straw, J. J. Pitts, J. Allen, G. A. Mills, W. H. Allen, T. H. Burras, C. S. Weeks, A. L. Northrop, E. A. Bogue, D. H. Goodwillie, L. Berhard, G. W. Stevens, H. R. White, J. H. Pere, J. B. Newbrough, F. Heindsman, O. E. Hill, H. G. Mirick, W. C. Michaelis, S. S. White, W. B. Roberts, C. D. Allen, W. Potter, J. C. Robins, M. L. Chaim, C. Merritt, R. P. Perry, G. E. Hawes—53.

At 1½ P.M. of Wednesday, the members were shown through Bellevue Hospital, and then took the little steamer to Blackwell's Island. At the Charity Hospital they were welcomed, in a few appropriate words, by Prof. Frank H. Hamilton.

The Professor then exhibited a girl of fifteen afflicted with lupus, who was at the hospital for the third time. A peculiarity of this case is the fact that small or moderate doses of iodide of potassium produced no perceptible results, and it was not until she was given twenty-grain doses that she improved.

A female patient subject to epileptic fits was then brought in and put under the influence of ether by Dr. D. H. Goodwillie. While the patient was being anæsthetized, Prof. Hamilton took occasion to remark that he was so enamored with Dr. Goodwillie's apparatus that he would be loth to do without it.

The patient was a bad subject for etherization, and might die under the influence, but he had before administered anæsthetics to epileptics

without bad results, and there was no choice, as an operation without anæsthesia would be quite as likely to prove fatal as with it.

The operation of amputation of the foot was then performed in the doctor's usual calm and skillful manner. While preparing to adjust the flap, he took occasion to remark that the arterial blood oozing from the vessels was very dark, from the effects of the anæsthetic—the proper proportion of oxygen being excluded for the time being. In reply to a question, he stated that the purple hue of the lips during the exhibition of nitrous oxide is probably due to carbonic acid in the blood.

After visiting the several wards under the care of Prof. Hamilton, the members returned to the city, highly pleased with their visit.

Second Day—*Evening Session.*

At eight o'clock the Convention was called to order by President J. G. Ambler. Minutes of the morning session read and approved.

R. P. Perry exhibited a brass articulator without lateral motion.

The subject of Dental Education being declared in order, Dr. Atkinson made some remarks favoring the exaltation of the standard of requirements of proposed students of dentistry.

Prof. Frank H. Hamilton coming into the room, was invited to the platform and introduced to the meeting by the President. The thanks of the Convention were tendered Prof. Hamilton for the courtesy and kindness shown the members who had visited Blackwell's Island during the afternoon.

The Professor being called upon for remarks, said he could recollect when dentistry was little more than a mechanic art; but it is now so far advanced that he was glad to fraternize with it, and as frequently consulted its authorities with reference to diseases of the face and mouth as he did those of general surgery.

He deemed it unwise to patent improvements in medicine and its specialties, but he did not ask, much less require, that other people should agree with him. He agreed with Dr. Atkinson, that specialists should be well educated in general medicine.

J. A. McClelland briefly described his method of putting up cases on the "Rose-Pearl Base."

After further remarks upon various subjects by Dr. Atkinson, the following resolutions, offered by C. E. Latimer, were passed without a dissenting voice:

Whereas, The present interests of the dental profession require a more liberal education on the part of those who shall henceforth enter its ranks; and whereas, it is notorious that the instruction imparted to students by private preceptors is sadly inadequate even to prepare them to enter upon a course of lectures in a dental college; therefore

Resolved, That we, as members of the American Dental Convention, do enter our most solemn protest against the loose method so common

among preceptors, of merely allowing students to remain in the laboratory to pick up what little knowledge they may.

Resolved, That it is the belief of this Society that no person should be admitted as a student of dentistry who is not fully qualified mentally, morally, and physically, nor for a less term than three years, and that a thorough course of instruction should be enforced, and a sufficient amount of time devoted by the preceptor to thoroughly prepare his pupil to enter upon a course of lectures in a dental college, with a sure foundation already laid, upon which may be built a professional character which shall make him an ornament to the profession, and a credit as well to his preceptor as to his Alma Mater.

The third subject coming up, Dr. Atkinson spoke at length on "Absorption and Reproduction of Alveolar Processes."

The Convention then proceeded to elect officers for the year, with the following result:

President.—J. M. Crowell, New York.

Vice-President.—J. A. McClelland, Kentucky.

Recording and Corresponding Secretary.—J. S. Latimer, 107 West 21st St., New York City.

Treasurer.—J. H. Smith, New Haven, Connecticut.

On motion, it was decided that the next (the 15th) annual meeting of the Convention shall be held at New Haven, Conn.

Adjourned to meet at ten o'clock next morning.

THIRD DAY—*Morning Session.*

According to adjournment, the Convention met at ten o'clock, Thursday morning, President Crowell in the chair.

Minutes of the evening session read and approved. The President announced the following Executive Committee for the ensuing year:

J. H. Smith, New Haven, Conn.; W. H. Atkinson, N. Y.; W. B. Hurd, N. Y.; J. C. Robins, N. J.; S. S. White, Pa.

On motion, it was decided that the Executive Committee shall determine upon the time of the next meeting, and give due notice thereof.

The fourth subject was then taken up, and Dr. Atkinson opened the discussion of "Improvements in Operative Dentistry," by advocating the preservation of dental pulps, and deprecating their destruction.

He is able to preserve them, even when suppuration has commenced. He dries the cavity perfectly, applies creasote, and then a little oxychloride of zinc, of a creamy consistence, which is adapted as a cap over the pulp by gently tapping it while soft. In a moment this sets sufficiently to permit the addition of the balance of the oxychloride. This temporary filling may remain some weeks or months, the major portion then cut out, and the cavity filled permanently. Should the pulp be inflamed and painful on presentation, or during examination and removal of the softened dentine over it, he quiets it with creasote, chloroform,

or other remedy, before inserting the cap and temporary filling. He does not remove the temporary filling, because pain recommences in the tooth after its insertion. Timidity and want of faith in the method may cause some to remove the oxychloride and apply arsenious acid, but this is entirely unnecessary.

C. E. Latimer had been trying to save exposed pulps by the method advocated by Dr. Atkinson, but he sometimes found severe pain to follow the application, and has felt constrained to remove the oxychloride and apply arsenious acid. He believed that very nice manipulation is necessary to success, and that general directions are insufficient.

In reply to an interrogatory concerning the treatment of alveolar abscess, the President observed that it would generally be found best to penetrate the alveolus with an instrument, thus forming an artificial fistula. The medication may then be made into the tooth and into the fistula.

On this point, Dr. Atkinson remarked that it was important that the perforation of the gum and alveolus should be in such a position and direction as to drain the pus away from about the neck of the tooth, for at that portion should be the pocket for the retention of the formative plasma.

C. S. Weeks said he had employed the creasote and oxychloride of zinc for covering and protecting exposed dental pulps for five or six years, generally with success, even after wounding the pulps; but in a few cases the pain continued so long that he had devitalized and removed the pulps.

C. E. Latimer described his method of using the oxychloride. He did not wish his patients to consider it more than a dressing.

One of his patients had teeth filled by Pierson with his preparation of oxychloride of zinc, and gave strong evidence of the disorganizing influence of free acid in the filling.

The President described, by the aid of diagrams on the black-board, a small cylindrical furnace for dentists' use.

B. W. Franklin offered the following resolution, which was adopted:

Resolved, That this Convention, while it does not deem it to be its duty to recommend or adopt new methods or appliances submitted at this meeting, nevertheless tenders its hearty thanks to all who have presented such modes, appliances, or systems of practice pertaining to dentistry.

The following delegates were then elected to represent the Convention in the American Dental Association at its next meeting:

J. G. Ambler, J. M. Crowell, R. P. Perry, C. S. Weeks, C. Merritt, A. L. Northrop, G. E. Hawes, B. W. Franklin, T. H. Burras, John B. Rich, H. R. White.

The chairman was authorized to fill vacancies in the delegation.

On motion of Dr. Ambler, a vote of thanks was tendered the Society of Dental Surgeons of the City of New York, for obligingly adjourning their meeting on Wednesday evening, and giving up their room for the use of the Convention.

On motion, adjourned.

ORGANIZATION OF THE DENTAL SOCIETY OF THE STATE OF NEW YORK.

BY DR. W. C. HORNE, OF NEW YORK CITY.

In the May number of the Dental Cosmos appeared an act of the Legislature of New York, authorizing the establishment of a State Dental Society, and eight district societies coextensive with the eight judicial districts. The formation of the latter was ordered at a date previous by four weeks to the former, so that the State Society should be formed by delegates chosen for that purpose by the district societies. The prime movers in effecting the passage of this act were Drs. A. Westcott, of Syracuse; L. W. Rogers, of Utica; and B. T. Whitney, of Buffalo, who were appointed a committee for this purpose by a meeting of dentists who had this matter under consideration. With a persistence which should be highly commended, after numerous delays and hinderances, which seemed at times insurmountable, the committee succeeded in getting their bill advanced over six hundred which had precedence, and, having secured the indorsement of the State Medical Society, through the personal influence of Dr. Westcott, the bill at length became a law.

But the labors of the gentlemen named did not cease at this point, inasmuch as the law required that the various organizations should be effected at particular dates and places. They next devoted their endeavors to the performance in each district of the necessary action which should insure the full development of their plan. This was happily effected in each of the prescribed localities, after repeated appeals from the committee in person, and by circulars addressed to every known dentist in the State. On the 2d of June, the district societies organized and elected delegates to form the State Society; also appointing censors having local jurisdiction.

On the 30th of June, delegates from the several district societies to the number of about forty met at the capitol at 9 A.M., and found the Assembly-room prepared to receive them by the person in charge. Dr. A. Westcott called the meeting to order, and Dr. B. T. Whitney was chosen temporary chairman, and Dr. C. B. Foster, of Utica, temporary secretary. The chairman stated in substance, as given above, the efforts of the committee to obtain the act under which the present convention was gathered. A committee of one from each district was then ap-

pointed to examine and report on the credentials of members. This committee soon brought in its report, naming the delegates from each of the eight districts, and also one from the New York College of Dentistry. The last item of the report was objected to, on the ground that the law specially provided that the State Society should be organized by delegates from the district societies, and that the delegates from colleges were only admissible after the permanent organization should have been effected. This question gave rise to an amount of discussion entirely beyond what the circumstances warranted, in view of the fact that the provision of the law was plain. The delegate from the college, Dr. N W. Kingsley, argued his own case, taking the ground that, as he had been sent by his constituents under the understanding that he was entitled to all the rights of other delegates, he should be admitted. The delegate was finally excluded until after the permanent organization. The roll was then called of all delegates, about two-thirds of whom answered to their names.

The election of officers was then proceeded with, and was exceedingly tedious. Two or three were nominated for each office, and an unnecessary amount of adulation was showered upon some of the candidates by anxious friends. The result was, the election of Dr. A. Westcott, President; Dr. W. B. Hurd, Vice-President; Dr. L. W. Rogers, Secretary; Dr. B. T. Whitney, Treasurer.

The President at this point declared the State Dental Society fully organized, and in possession of all the privileges accorded by the law.

The Rules of Order of the State Medical Society were temporarily adopted, and a Committee on By-laws, one from each district, was appointed by the President, with Dr. L. W. Rogers as its chairman.

A vote of thanks was passed to the committee who secured the passage of the act, and to members of the medical profession who gave their influence in its favor.

The first business in order was the division of the delegation from each district society into four classes, of two delegates each, to serve one, two, three, and four years respectively. For this purpose the society took a recess of a few minutes, and each delegation retired and settled its individual status by drawing lots. On coming together again, the chairman of each delegation reported the result to the President, by whom it was announced.

The delegates had now been convened from 9 A.M. to 1.30 P.M., and an adjournment was had to 3 o'clock. The interim was occupied by the dinner service, and consultations in the various delegations as to the permanent members next to be elected.

About half-past 3 o'clock the President called the meeting to order, and the Committee on By-laws was called on to report. Not being ready, they were ordered to report at 9 o'clock the next morning, that to be

the special order of business till disposed of. The next regular business under the act of incorporation was the election of permanent members from among dentists resident in the State; not to exceed twenty in number. A motion was made for a committee of eight, to be appointed by the chair, to nominate permanent members. Whatever the intention of the mover, the effect of the resolution would evidently be to leave it in the power of the President, through his appointees, to control the character of the permanent membership. A strong diversity of opinion at once manifested itself; those favoring the resolution claimed as its intent that the permanent members should be selected from the State at large, without any regard to locality: that they desired that eminent dentists throughout the State should be put into these permanent positions. On the other side, it was objected that the resolution afforded too much opportunity for centralization of power, and suggested, as the fairer way, that each delegation should present the names of as many candidates for permanent membership as it was entitled to. This would give all the delegations an equal share in the nominations, and not impose unpopular persons upon any district. It was urged in reply, that this would be a recognition of the doctrine of State rights and secession; that members present were as members not of district societies, but of the State organization, and that local wishes and prejudices should not be permitted to decide the question. This view was most vigorously sustained by the only member not present as a delegate from a district society, and was met with the response that the delegation from each district society must of necessity act in view of the approval of its constituents—it was not elected by the State; it did not represent the State; it was elected from and represented a district. It was fairly presumable that the delegation from each district knew best the professional affairs of its district, and it would be most unjust that, on the nomination of persons out of the district society, or not specially concerned for its interests, permanent members should be elected who had taken no part in their local organizations, or had intimated that they held themselves aloof from feelings of superiority. The first district was alluded to as an example in point, where some of those who had been long and widely known to the community and to the profession had ignored the organization of the district societies, or more openly shown their dislike of the movement, while others manifested their interest only in efforts to create confusion and discord. Would it be fair to a delegation representing a membership of sixty that their quota of permanent members should be chosen without regard to these facts, and, perhaps, from among the very men who had done nothing toward sustaining the local societies, while they were always ready to grasp the honors? If the nominations were left to the decision of each delegation, the result would doubtless be generally if not wholly satisfactory.

The motion for a committee was lost, after a long contest of an argumentative and parliamentary character; a motion to refer the nominations to each delegation was opposed by counter motions of various sorts, and was at length brought to a vote under pressure of the previous question, and carried. At 6 o'clock an adjournment was had to 8 o'clock, at which hour the delegations were ordered to report their nominations.

Promptly, at the hour named, the President took the chair, and the delegations were called, as usual, in their numerical order; an election by ballot following each nomination, with the following result:

PERMANENT MEMBERS.

1st District.—		A. C. Hawes, J. G. Ambler, W. C. Horne, O. A. Jarvis, N. W. Kingsley.
2d	"	H. G. Mirick, G. A. Mills.
3d	"	H. H. Young, J. A. Perkins, A. Nelson.
4th	"	J. H. Vedder, Dr. Cadwell.
5th	"	A. Westcott, G. A. Foster.
6th	"	R. Walker, A. M. Holmes.
7th	"	J. Requa, A. G. Coleman.
8th	"	G. E. Hays, C. W. Harvey.

The chairman of the second delegation stated, on making the nominations, that the first and second districts being entitled to five permanent members, the second delegation had conceded the right to nominate a third permanent member to the first district.

The third and fourth followed the same lead.

The fifth and sixth districts nominated Dr. N. W. Kingsley as their fifth delegate, which was acknowledged by that gentleman, who returned his thanks for the honor done him in the election of himself as one of the eminent members of the profession.

The eighth district declined to make any nominations, which occasioned no small degree of astonishment, inasmuch as Dr. B. T. Whitney, the chairman of that delegation, had but a few minutes previously taken the floor and "insisted" that the eastern districts were taking all the delegates, and that when the western end of the State was reached there would be none left. Only seventeen permanent members had now been elected, the number allowed by the law being twenty. Dr. Westcott called the Vice-President to the chair, and argued that the non-action of the eighth district should not be allowed to block the action of the society. He urged the desirableness of electing the full number allowed, and hoped that, unless the members of the eighth delegation would settle their differences and nominate, the society would do it for them; he should like to see more members chosen from New York City. Dr. Whitney protested against any one coming in to their district to interfere with their affairs.

An effort was made by some members to procure a nomination by the eighth delegation, but they were unsuccessful; and a nomination was then made for them by some members outside of their number, namely, Drs. B. T. Whitney, G. E. Hayes, and C. W. Harvey. Upon balloting, Drs. Hayes and Harvey were unanimously elected, but the vote on the third member was divided between Drs. Whitney and A. C. Hawes of New York; and the latter, having the greater number of votes, was elected. It was now near 11 P.M., and the meeting adjourned to Wednesday, at 9 A.M.

At the appointed time the society was called to order, and the minutes were read and approved.

Dr. L. W. Rogers then presented a draft of By-laws for temporary adoption, until further action should be taken. Some of those reported were laid on the table, others were rejected, and the most necessary adopted, as follows:

The first four defined the duties of the officers; the fifth provided that elections of officers, censors, and permanent members should be by ballot; the sixth authorized the appointment by the President of standing committees for the year on business, membership, and printing; the seventh fixed the initiation fee of permanent members at $10.00, and an annual fee of $5.00 thereafter, and provided that no one should be entitled to the privileges of membership until the initiation fee was paid; the eighth fixed a quorum for the transaction of business at fifteen, a less number to have the power to adjourn from time to time; the ninth gave the President power to fill vacancies in the officers and board of censors, subject to the provisions of the act; the tenth prohibited members of the State Society from voting themselves any compensation; the eleventh provided that members might be expelled on complaint of district societies, or of two members of the State Society.

A new committee was then ordered on Constitution and By-laws, Dr. Rogers chairman; to report at the next meeting.

The election of Censors next came up, and, the districts being called in numerical order, the chairman of each delegation reported one or more names, and the following were elected

The Board of State Censors.

First district, J. G. Ambler, New York; second district, W. B. Hurd, Brooklyn; third district, A. Nelson, Albany; fourth district, Z. Cotton, Cambridge; fifth district, A Westcott, Syracuse; sixth district, R. Walker, Owego; seventh district, F. French, Rochester; eighth district, R. G. Snow, Buffalo.

A resolution was adopted taxing each of the district societies $40.00 for the expenses of the organization of the State Society, to reimburse the delegates present for an equal amount advanced by them.

An amendment was proposed to the organic law requiring the society to make an annual report to the Legislature; this was referred back to the original committee, with instructions to procure its passage if possible. It was understood that by this means the society would secure the printing of at least eight hundred copies of its transactions.

A resolution was adopted, that when the society adjourn it be to meet at Albany, on the first Tuesday in February, simultaneously with the meeting of the State Medical Society, and of the Legislature.

The members were requested to prepare essays for presentation at the next meeting of the society; and delegates were appointed to attend the meeting of the American Dental Association.

The society then adjourned.

The result of this meeting may be variously estimated. The machinery of the society is all formed and in position; the organization is not a cumbrous one, but yet will require skillful management to secure successful operation. It is not easy to bring together so large a body of men, unacquainted with each other, and obtain unanimity at once. There were conflicting interests at work in the convention from the very start; and either a design that a particular set should have the management of everything, or, if there were no design, an unfortunate chain of circumstances looking like it. The localities of the officers elect are: President, Syracuse; Secretary, Utica; Treasurer, Buffalo; which one of the delegates observed looked very like a Central Railroad arrangement. The first and second districts, comprising ten of the most important counties of the State, and including New York and Brooklyn, with a great preponderance of the profession, succeeded, after a protracted effort, in electing the Vice-President.

While the offices are filled, the organization cannot be said to be yet completed. The act of incorporation is a very general one, and the degree to which the society will seek to avail itself of its generalizations has not yet been developed. The Board of Censors, who have not yet met, have full power to grant diplomas; the opinion seems general that the examinations before that board will be of a character which any dentist of good ability can pass. The By-laws as brought in by the committee were of a character much more favorable to executive power than was generally agreeable—hence the postponement or rejection of many of them. There was little time for discussion, and those only of urgent necessity were adopted. At the next meeting the committee will report fully, and there will be ample time for consideration.

There was probably a feeling of disappointment in some quarters that the delegations from the eastern end of the State were not composed to a greater degree of men whose antecedents reached back nearer to the beginning of this century. Any such repinings were lost

upon the material of which those delegations were formed; all of them had been workers in local societies for years, and were no more over-awed in the presence of a score or so of their colleagues at Albany than in that of the greater numbers they were accustomed to meet nearer home. That there were misunderstandings, it were worse than useless to deny, but there can be no doubt that these will entirely disappear, if the advancement of the avowed object of the organization is not subordinated to a further ambition for personal aggrandizement.

The *personnel* of the society is good; the appearance of the body in group, as they were photographed on the steps of the capitol, is such as would be creditable to any professional body. The delegates from the State and the several district societies will doubtless swell the attendance at the American Dental Association very considerably. A good work has been commenced in the State of New York for the further advancement of the dental profession, and it is commended to the kindly sympathy and emulation of the profession everywhere.

SOCIETY OF DENTAL SURGEONS OF THE CITY OF NEW YORK.

REPORTED BY JOHN M. CROWELL.

Treatment of Exposed Pulps.

Dr. W. H. Atkinson said: This is a question of too much importance to be permitted to go by default, and, in the absence of any regularly prepared paper, I will endeavor to occupy the time as well as I may be able in an extemporaneous manner. All bodies require a leader, and all leaders should be well qualified for the exercise of their function, to secure the highest results. Not counting myself so qualified, I nevertheless feel competent to speak before the world on this question.

The subject of the evening may be regarded as one of immense magnitude, involving as it does the laws of health and disease, no less than the procedures necessary to conserve the one and supplant the other.

The past history of the treatment of exposed pulps would be anything but complimentary to the intelligence of our body.

Were we to require a distinct reply of yea or nay to the question, Will you attempt to save the life of an exposed pulp? I could not hope for an affirmative reply but from an insignificant minority of those in the full practice of dentistry as it is at this day.

The laws of health and disease reach far beyond that which is apparent to sight, involving the origin and extinction of bodies, including creation, propagation, and growth, the latter of which is effected through a process called nutrition, the complete understanding of which will

make us masters of the situation. In fact, he who instantly obeys the physiological and moral law at this day is an object of invidious remark in the community; for life is not a repetition, but a progress, and each phase in life must be a new experience to each individual.

The great desideratum will be attained so soon as we all become a law to ourselves, by instant, spontaneous obedience to our highest and best. That I may not condemn myself by the sweeping announcement of this doctrine, I will present it as my most decided conviction, that nine-tenths of exposed pulps, when not inflamed, are capable of being restored to health; and also, that 50 per cent. of those exposed and suppurating are amenable to a like result. That pulps may be exposed, considerable portions of enamel and dentine must be removed.

There are but two possible methods by which this can be effected, viz., abrasion and solution. The first is mechanical; the second, chemical and vital. That exposure may result in the latter mode, disease must be present.

All disease has its origin, first, in the unseen surroundings of persons, organs, tissues, cells and constituents of cells, from whence it makes its advent into the chaotic juices of the flesh, which are the only substances of the necessary qualities of refinement and tension to admit the subtile influence.

It is apparent to him who conceives the beautiful significance of the last statement, that favorable surroundings induce normal, physiological or healthful actions, in not only the constituents of these departments of systemic life, but in the entire personality, moral, mental, and physical.

This being the primary, let us endeavor to state the secondary origin of disease. The secondary consists in an arrest of the outward passage of worn-out or effete materials from the territories denominated cellular, in which all nutrient action holds its court.

That we may the better apprehend the minuteness of the field of physiological and pathological activities (the latter being any deflection of the former from a direct line), let us state that physiology consists in forming and sustaining in health all the parts of living bodies, which can only be done in the mammalia through the functional activity of blood corpuscles.

White tissues are constructed from white-blood corpuscles; red tissues (muscular fibrillæ) from red-blood corpuscles.

Having now reduced the field of our investigation to this limit, we are enabled confidently to assert it as the initiative of all possibility of organic metamorphosis. All the text-books, as far as known, ignore this essential basal doctrine of physiology.

The transit of blood corpuscles through the amorphous or structureless walls of capillaries and the venioles, may be said to be the corner-

stone or most essential pronouncement illustrative of functional activity. That which has been denominated "disease" by all pathologists, is merely verbal delineations of the effects of disease; thus ignoring in toto the demoniac possession that produced the derangement. This is of a piece with much else that passes for definition—simply a change in mode of statement, no more lucid or convincing than that it was used to explain.

Thus, then, disease may be defined to be evil or malign presence in the unseen territories whence vital actions arise, and is tolerable or intolerable to these parts in the ratio of its potency.

When in tolerable degree, the tissues are sickened, and thus we have the inception of the pathological state.

When intolerable in degree, it kills the molecules and cells, thus establishing necrosis of the territory to the extent of complete dominion. The former represents the inception of chronic disease, the latter of acute disease.

Morbid growths find their inception always in the former, and their culmination sometimes in the latter.

Although we cannot ignore the nomenclature of the past, it is incumbent upon us, if we would progress, to modify it so as to meet the advanced conceptions of improved observations.

The old definition of pus, so long adhered to, will prevent just apprehensions of what it is, how it is produced, and how it may be prevented and dispensed with. Every body is known by some character that distinguishes it from every other body. That which distinguishes pus is a characteristic cell; but this cell, floating in any distinct fluid—water, milk, or alcohol, for instance—would not entitle us to denominate them by this name. The old definition of pus defines it to be composed of two parts characteristic of its body—the pus cell or globule, and a creamy fluid, which together and indiscriminately are denominated pus.

Fluid pus is fluid nonsense; like most of the abortive attempts at definition so thickly interspersing pathological writings. That which is denominated fluid pus of benign or laudable form, is either normal plasma of the blood in aqueous dilution, or the first stage of disintegration of organizable plasma just before it assumes the character which is called sanies.

Sanies is simply disintegrated tissue and pabulum, utterly incapable of being converted into even abnormal structure.

All these actions, normal and abnormal, are but the play of affinity between bodies possessing the necessary elements of individual existence—centre, surface, substance.

The essential constituents of nutrient activity are ghost (or form-type), body, and pabulum.

By a glance at the statement of the function of white-blood corpus-

cles—being the element of connective tissue or white tissue—it will be seen that a marked change of its form ensues upon its advent into the intercellular fluid, which constitutes its metamorphosis into the filaments of the tissue.

Whenever this typal change is arrested for a sufficient length of time after the transit of the corpuscle through the wall of the vessel, it dies by degrees; and when quite unable to push out processes of its pellicle to attach it to already formed structure, that would enable it to transform itself into a connective tissue corpuscle, and when it barely holds life-endowment sufficient to retain sphericity of form, it becomes a pus cell.

There is a stage of arrest of this power of conversion into connective tissue corpuscle that results in the production of a cell with less than the normal quantity of life-presence; and hence, instead of death of the corpuscle, we have debilitated tissue. There is a degree of life-endowment that converts weakened connective tissue corpuscles into embryonic cells, capable of transformation into medullary cells; and these into osteoplasts, and finally these may be metamorphosed into true bone cells.

Calcification by infiltration of lime-salts may arrest further transformation at any of these stages of metamorphosis. Having our white-blood corpuscle converted into a pus cell or pus corpuscle, let us see what becomes of it. That depends upon many conditions hard to perceive, harder to define, hardest to prove as a verity to minds unwilling to do the requisite work of preparation. Without entering into the fullness of detail of the laborious investigations that set this matter at rest, let it be said: Solution and absorption is the most desirable method to rid us of this effete body. The next to be chosen is desiccation and encysting of this body. These limit the possibilities in purely benign and laudable pus. One degree of malignity above this state will involve the production of a very mild sanies, and result in what is called phlegmonous abscess, which evacuates itself by pointing if not assisted by the surgeon's knife, or repeats for the whole contents of the abscess the rôle of solution and absorption, or desiccation and encystment, as instanced above. All these changes in the anatomical elements of the living body are governed by an unseen affinity, the result of which is readily perceived in the changed condition of the bodies subject to sight. As familiar instances of this change, it will suffice to refer to embryonic or fœtal conditions—childhood, youth, maturity, and age; all of which are dependent upon the unseen force so easily recognized by every one in the instances named.

Centre, surface, and substance are the essential elements of finite bodies, and are interdependent necessities to the conception of individual body. In like manner each specific body is in possession of the charac-

ter that differentiates it from other bodies, and enables us to give it a name by which it may be recognized. Where there is no affinity between bodies, they are absolutely indifferent to each other, and can by no possibility influence each other in any degree. Ideally this is clear and certain, but practically impossible and false, unless there be two eternals, two infinites, two opposites, all of which does violence to the human mind to conceive. Dominion must belong in the absolute sense to a unit, and when struggle for dominion exists of opposing claims, whether dual or multiple, one alone must prevail. Unfortunately for the human family, or fortunately, as the case may be, we are not in possession of the knowledge of affinities subsisting between various elements and bodies upon simple acquaintance with them as individuals, however intimate such knowledge may be. Nay, further, we may be well acquainted with the physical proportions and chemical equivalents of any two or more bodies, and yet be utterly unable to determine what the results of bringing them within the sphere of influence will be. An immense amount of infraction of law has been the condition by which the law has become known. To all who regard themselves entitled to the "freedom" of the planet, this may seem a very tyrannical method of instruction; but to all who are willing to spend and be spent in the fulfillment of the mission of life, it seems unjust to make final deductions before having the statement of the entire premises. Canceling all the past results of observation as fast as proved, and keeping an ever-open door of freedom for the investigation of the problems of life as they arise, we lay aside many weights and enhance our progress in the solution of these problems of life. Our bodies being composed of equations of elemental planetary substances (or simple elements as they are called), it might seem fair and reasonable to assume that some sort of affinity existed between our bodies and every other planetary substance.

The planet itself sprang from chaos, or due elemental admixture of amorphous substance. But we find, as the result of experimental research, that these affinities at one time tend to our well-being, and at another to our destruction; and yet, at the different periods of life and condition, substances may alternately act upon us as food, poison, or medicine, in accordance with our state of fullness or deficiency. So complicated is the structure of the tissues of our bodies, that we are without data for the chemical equivalency of the formed tissues. In fact, it is more than doubtful if any general standard of equation exists even for class, age, or sex.

It is well proven that all our physical foods are the products of other living bodies, mineral, vegetable, and animal; these being but differing degrees of organic results of living presence. Those which we call opposites in quality of organic being are reducible to modification of quantity of life-presence.

Where affinities subsist, they complement each other when union is

effected. Alkalies and acids, cold and heat, love and hate, etc., etc., to the end of the chapter, might be instanced as examples of the oneness in diversity that lies at the foundation of all functional activity, where matter and mind consentaneously conspire to people the planet with multifarious forms of being.

In fact, all the metamorphoses of our bodies are but integrations and disintegrations, refining and unifying, or degrading and dispersing, by distributive energy, the entities, solar and mundane (sun and earth), of which our personality consists.

After a physiological expression of life-movement has been well understood, and deteriorations thereof acknowledged to be pathological, a very important question arises as to the point at which restoration to healthful action, or increment of morbid productions, takes the place of healthy tissue.

The line that marks the turning point from health to disease, and from one well-defined expression of morbidity to another, is so occult as to make it difficult of demonstration.

All physiological production and renewals of tissues arise in and are nourished by an amorphous mass of chaotic elements. Whether one tissue can be converted into another directly without the intervention of solution reducing it to chaos, will hardly bear investigation. For all the examples in which the process is apparent to sight, a due course of alternations of generations of cells is evoked in the process, plainly hinting that the same course is pursued where nature works beyond the domain of vision. So entirely has first principles been ignored by those who plume themselves upon being eminently "practical" men, that we are forced back to original investigations in the field where these principles are displayed, for the text. This text should be a simple enunciation of that which takes place under our observation.

All bodies subject to sight and provable by our senses, are denominated physical bodies, in which certain processes occur.

These processes are biological—in other words, living processes, although not so recognized in scientific literature or among scientific men in the accepted sense. Could we but overcome the incubus of bad nomenclature, and strictly confine ourselves to exactness of definition, our work would be facilitated. Metamorphosis of bodies is effected by a force that may be regarded as living or life producing.

Gases, by that which is denominated compression, become liquids; and these, by increased increment of the same force, become solids.

Pressure may be produced by what is called a purely mechanical process, and then the body is not changed so as to be a new body.

But another form of pressure, called affinity, is capable under definite circumstances of condensing two or more gases so as to produce a liquid body, by combining in definite proportions, that occupies immensely less space than the gases did that gave it origin.

We are as certainly convinced that conditions are necessary to the change of gases to liquids, and these to solids, no less than their reversal will be followed by conversion of solids to liquids, liquids to gases, and these to finer ethers, as we are that these bodies really exist at all.

Many of these bodies are only known to us by deductions educed by change of relations in what is called analysis—in other words, they are purely mental conceptions, and are not sensual perceptions, as are those that address themselves to touch, to taste, to smell, to sight. All bodies capable of acting on the human organization in a purely physical manner are solids; those acting biologically must be fluid, ranging from densest liquid to gas, ether, and spirit.

The energy with which a solid by molecular change takes the gaseous state is infinite. Instance, detonating compounds and explosives in general.

That convenient word, condition, is but poorly understood, for it involves infinity of change in time and space, and all possibility of relation. Much of our most valuable knowledge of conditions has its origin in fortuity, blunder, and finesse.

My own knowledge of the value of the hydrochlorate of zinc, and of the oxychlorate of zinc, had its origin outside of regular scientific expectancy and deduction; for I had supposed that death would result to the pulp were it directly applied to its exposed surface.

The remarkable affinity by which the hydrochlor-zincate of albumen is produced, has only become known to me by the results of irregular experimentation in many hands, beginning in 1856, not culminating until early in 1867, and still, as I believe, but in the infancy of its munificence. The distinguishing trait of the hydrochlorate of zinc is that it is its own limitation and antidote, by reason of the ontological and organological law referred to above, in the conversion of the living structure into chaos or a magma out of which to produce a barrier of protection and shield to the delicate pulp, out of which a new calcigerous wall is ultimately prepared completely answering the purposes of normal secondary dentine. This process of chaotification is indeed a great marvel, not only by what it does, but by the manner in which it acts. It is an astringent, and mechanically closes the capillaries by its biological force, driving the blood completely out of the vessels, beyond the limit of its combining power, thus reducing the connective tissue of the nerves, vessels, and whole pulp (so far as it goes) into a colloid mass, ready for transformation, without the possibility of the formation in the pulp territory of one globule of pus.

To make all things sure, in all cases of exposed or nearly exposed pulps, fully saturate with pure creasote previous to the introduction of the oxychloride of zinc. I have been led strongly to suspect that a reopening to a certain extent of the blood-vessels, contracted by the mere

proximity without combination of the zinc, takes place in the pulp, favoring the process of calcification. My reasons for so thinking are the peculiar results witnessed in cases where the colloid mass was so thick as to entirely obscure the pulp redness at first; that afterward, on the removal of the temporary stopping, presented a ring of secondary dentine around the margins of exposure, with a mere pin-hole in the centre, through which the red pulsating pulp was brilliantly displayed.

Dr. J. S. Latimer said that Dr. D. L. Dodson, of Williamsport, Pa., used the spray of rhigolene for obtunding the sensibility. He prevented the congelation in the tubes by keeping the bottle as cool as possible, adjusting the flow of the fluid through the lower portion of the tube. The pain of freezing is but slight, and patients came from far to Williamsport to get the benefit of his process. Dr. L. stated that the congelation was frequently caused in the tubes by grasping the bottle with the warm hand. The rhigolene should be applied to the gum first, gradually bringing it on the tooth. The sensibility being obtunded, the assistant occasionally puts the jet on, and in this way it is continued for excavations.

NORTHERN IOWA DENTAL ASSOCIATION.

BY J. T. ABBOTT, MANCHESTER, IOWA.

The first annual session of the Association met at Cedar Rapids, June 9th. A goodly number of dentists, embraced in the jurisdiction of the Association, were present and took an active part in the subjects discussed. 1st. Cleaning teeth. 2d. The best material for and modes of filling. 3d. Preventing and correcting irregularities. 4th. Absorption of gums and alveolar process. 5th. Mechanical dentistry. 6th. Miscellaneous.

A code of dental ethics was adopted, setting forth the relative duties of dentists and patients, dentists and physicians, and the responsibility of dentists, the discountenancing of empiricism, and the duty of maintaining professional character,—the code being very nearly the same as that adopted by the American Dental Convention. They adopted for their government, also, in prices, a uniform fee-bill.

The dentists generally of Northern Iowa have been somewhat lax in these matters, but have felt the necessity of concert of action. The Association was formed to reach and influence more particularly those who ignored, or were distant from, or did not feel interest in, the State Dental Association.

We feel already that a good result has been gained.

The following officers for the ensuing year were chosen:

President.—P. C. Branch, of Vinton.

Vice-President.—M. D. Goble, of Dubuque.

Treasurer.—C. Poor, of Dubuque.

Recording Secretary.—J. T. Abbott, of Manchester.

Corresponding Secretary.—C. R. Sterneman, of Cedar Rapids.

Executive Committee.—C. R. Sterneman, M. D. Goble, J. T. Nicholson.

Committee on Membership.—C. Poor, C. A. Clarke, D. H. Gill.

Committee on Dental Ethics.—A. B. Mason, J. T. Abbott, A. V. Eaton.

Dr. A. B. Mason, of Waterloo, was chosen delegate to the National Convention to be held at Niagara Falls.

There was but little time unoccupied during the two days' session. A lively and active interest was manifested. The next annual meeting will be held at Dubuque, on the second Tuesday of June, 1869.

BUFFALO DENTAL ASSOCIATION.

At the regular annual meeting of the Buffalo Dental Association, held on the evening of Monday, June 1st, 1868, at the Dental Depot, Nos. 307 and 309 Main Street, the following officers were duly elected for the ensuing year:

President.—Dr. G. C. Daboll.

Vice-President.—Dr. A. P. Southwick.

Secretary.—Dr. S. A. Freeman.

Treasurer.—Dr. M. B. Straight.

A committee appointed at a previous meeting to prepare a fee-bill, also made a report, which was received and unanimously adopted.

S. A. Freeman, *Sec'y.*

NORTHERN OHIO DENTAL ASSOCIATION.

The annual meeting of the Northern Ohio Dental Association was held at Cleveland, Ohio, May 5th and 6th, 1868. The officers for the ensuing year are as follows:

President.—W. P. Horton.

Vice-President.—F. S. Whitecar.

Recording Secretary.—H. L. Ambler.

Corresponding Secretary.—Charles Buffett.

Treasurer.—J. E. Robinson.

Board of Examiners.—C. R. Butler, C. Buffett, Corydon Palmer.

Three sessions were held each day. Professor Taft was present, and by request made remarks, which elicited much attention. A move in the right direction was taken, by appointing a committee to secure the incorporation of the society. The association being entitled to seven delegates to the American Dental Association, the following were appointed: Drs. C. Buffett, B. F. & J. E. Robinson, Slosson, Huntington, Ambler, and Harroun.

The next annual meeting will be held at Youngstown, Ohio, on the first Tuesday in May, 1869, when the following subjects will be considered: "Pathology and Treatment of Periodontitis," Dr. Spellman. "Dental Education," Dr. Horton. "Contour Fillings," Dr. Butler. "Dental Hygiene," Dr. Ambler. Voluntary essays by any member.

The Society then adjourned, closing their annual session, which all felt was one of profit, and long to be remembered.

HENRY L. AMBLER, *Recording Secretary.*

EAST TENNESSEE DENTAL ASSOCIATION.

A SPECIAL meeting of this body was held at Morristown, Wednesday, the 17th of June, 1868.

An interesting essay on "Alveolar Abscess" was read by Jas. Carson.

H. E. Dodson, D.D.S., of Cleveland, and W. H. Morgan, D.D.S., of Nashville, were elected members, and Drs. Jno. Fouche and Wm. H. Cooke were elected delegates to the American Dental Association.

Adjourned to meet at Knoxville, on the third Wednesday in October next.

OHIO BOARD OF EXAMINERS OF DENTAL SURGERY.

THE Board of Examiners appointed by the Ohio State Dental Society, in pursuance of the law passed by the Legislature of the State of Ohio at its last session to regulate the practice of dentistry in this State, met at the Neal House, Columbus, Ohio, July 8th, at 10 o'clock A.M., and organized by electing Dr. J. Taft, of Cincinnati, President, and Dr. W. P. Horton, of Cleveland, Secretary and Treasurer.

The duty of this board is to examine all applicants as to their qualifications to practice dental surgery, and to grant certificates to all having the proper attainments.

The next meeting of the board will be held in Columbus on the first Tuesday of December next, for the examination of applicants, and to transact any other business that may legitimately come before it.

W. P. HORTON, *Secretary.*

MASSACHUSETTS DENTAL SOCIETY.

THE annual meeting of the Massachusetts Dental Society was held May 21st, 1868, at their hall, No. 12 Temple Place, Boston.

The officers elected for the ensuing year were as follows:

President.—E. G. Leech, D.D.S.

First Vice-President.—Dr. Thomas H. Chandler.

Second Vice-President.—Geo. L. Cooke, D.D.S.

Recording Secretary.—Dr. D. G. Harrington.

Corresponding Secretary.—L. D. Shepard, D.D.S.

Treasurer.—Dr. J. T. Codman.

Librarian.—Geo. T. Moffatt, M.D.

Microscopist.—T. B. Hitchcock, M.D.

Executive Committee.—Drs. J. A. Salmon, T. B. Hitchcock, O. F. Harris, James Shepherd, and Edward Blake.

Dr. Thomas H. Chandler delivered the annual address. Subject, "Dental Education." D. G. HARRINGTON, *Rec. Secretary.*

EDITORIAL.

NEW ORLEANS DENTAL COLLEGE.

IN the second annual announcement of this institution, we are pleased to notice the name of JOHN G. ANGELL, D.D.S. (as adjunct Professor of Operative Dentistry), a gentleman who graduated from the *Philadelphia Dental College* with the highest honors. We wish the institution every success. J. H. McQ.

AMHERST COLLEGE.

AT the commencement of this institution, held July 9th, the honorary degree of A.M. was conferred on LUTHER D. SHEPARD, D.D.S., of South Boston, Mass. J. H. McQ.

BIBLIOGRAPHICAL.

DENTAL MATERIA MEDICA. Compiled by JAMES W. WHITE. Philadelphia: Published by SAMUEL S. WHITE. 1868.

This little work had its origin, as the preface to it says, in the necessity of preparing something as a ready answer to numerous letters constantly received asking for information in relation to the various preparations described in it. Intended thus to lighten the labor of correspondence on the part of the publisher, it will prove in addition a valuable work of reference to the dental practitioner, giving in a condensed form facts scattered through voluminous works, and in the pages of magazines for a long series of years, many of which are inaccessible to those desiring the information. Those who are supplied with such works will find the description of the dental application of the various remedies, here collected together for the first time, of service, if for no other purpose than reminding them of agents and their uses which they may have forgotten. The necessity of such a work has been long apparent, and it is a matter of surprise that some member of the profession particularly interested in this direction has not prepared one for general use. The readers of the treatise under review will generally admit that the gentleman who took hold of this matter has performed his work in a manner highly creditable to himself, and calculated to be of advantage to those who may consult its pages. J. H. McQ.

PERISCOPE OF MEDICAL AND GENERAL SCIENCE IN THEIR RELATIONS TO DENTISTRY.

BY GEO. J. ZIEGLER, M.D.

Food.—Dr. Letheby closes his fourth lecture on this subject (*Med. Press and Circular*) with the following instructive remarks: "And now, in conclusion, having directed your attention to the nutritive values of different kinds of food; to their functional and dietetical powers; to the modes in which they are associated; to the quantities required for ordinary labor; to the manner in which they are digested; to the effects of culinary and other treatment; to the way in which they may be preserved; and to the causes of their unwholesomeness, we may finally ask if any great generalizations can be deduced from our inquiries?

"In the first place, you will, I think, have observed, that there are very striking evidences of design in the way in which organic matter is constantly kept in motion, for, whether living or dead, it is always in a state of molecular activity—either advancing toward the highest state of organization, or retreating to the confines of the mineral kingdom. The result of this is that, with a comparatively small amount of material, and with but little expenditure of force, the work of the living world is fully and effectively performed. Starting from the mineral kingdom, as carbonic acid, water and ammonia, the elements of organic nature pass through a succession of changes, first in the vegetable and next in the animal, until they reach the summit of organization, when they again return to their primitive condition. In this manner a never-ending round of change is perpetuated, and the same material and the same force are kept moving in the same continuous circle. Through the efforts of the plant the crude materials are formed into vegetable acids, sugar, gum, starch, fat, albumen, and tissue; and then the animal converts them into higher forms of structure, as into gelatine, muscle, and brain; the two extremes, therefore, of these changes are, to use the words of Gerhardt, carbonic acid, water, and ammonia at one end; albumen, gelatine, fat, and cerebral matter at the other—but the transitions to these extremes are countless, and are, as yet, beyond the reach of science. Broadly, however, we may say that the chemical functions of the plant are those of reduction or deoxydation, whereby carbonic acid and water are deprived of their oxygen, and moulded with nitrogen into food; while those of animals are of an opposite nature, for they destroy this food by oxydation. The plant, therefore, is the machine or medium whereby carbonic acid, water, and ammonia are converted into new compounds, and light and heat are transformed into chemical affinity; and the animal is the medium or machine whereby these compounds are destroyed, and their affinities changed into other manifestations of force, and finally into heat. In this way the circuit of change is completed, and it is not, therefore, difficult to trace the phenomena of vitality to the cosmical forces which the plant had imprisoned. But shall we ever be able to follow through all the intricacies of change, the countless transitions of both matter and force in their passage from the mineral kingdom to the animal, and then back

to the mineral again? It is easy to connect, by a correlation of force, the muscular movements of the animal body, and even the highest efforts of the human mind, with the sunbeam which the plant had arrested; but shall we ever be permitted to unravel those mysterious functions which constitute the phenomena of life? Why is it, for example, and how comes it that the living cell of the plant is able to aggregate mineral matter in opposition to the common laws of affinity, and can transform light and heat into cell-force? How is it, too, that the animal in reversing the process, and so restoring the play of affinity, is able to transmute it into other manifestations of force? At present, the utmost we can say of it is, that organic matter is the appointed medium of all these changes, and is designed for the exhibition of vital phenomena, just as mineral matter is the appointed medium for the phenomena of electricity and magnetism; and yet to some extent, perhaps, we are able to penetrate the mystery; for by finding the clue to the peculiar action of the vegetable in reducing chemical compounds, we can, by operating on such substances as carbonic acid, water, and ammonia, produce a large number of organic principles: in fact, of the three great classes of alimentary substances to which I have so frequently directed your attention—namely, the oleaginous, the saccharine, and the albuminous—it may be said that the first is already within the manufacturing power of the chemist, and the second is nearly within it: so that there is abundant proof that the agency of a vital force is not necessary to the formation of organic compounds, and there is even hope that the fabrication of food may not be altogether beyond the capabilities of man."

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Egg Hatching Apparatus.—As a step in the direction of Dr. Letheby's idea for the artificial production of food, we notice the following improvement by one of the dental fraternity, described in the *Practical Farmer:* "Dr. A. Preterre, 159 Bowery, exhibited before the New York Farmers' Club his eccaleobion, which he stated 'is no patent, neither has he any for sale.' He brought in a brood of lively chickens, some of which were as large as quails, while others were only a few days old, all of which ran about the room and picked up crumbs, to the great amusement of those who thought it a marvel that fine chickens can be raised without hens.

"Dr. A. Preterre entertained the audience for a brief period in explaining the operation of his eccaleobion. The heat is generated by a lamp. The eggs are placed on a sheepskin, on the woolly side, and the skin rests on a metallic reservoir filled with water. The desired temperature is regulated by means of a metallic thermometer connected with an electric bell, which is rung when there is likely to be too much heat, or not enough. The whole arrangement is an ingenious apparatus for the purposes intended. The alarm bell affords perfect security against one of the greatest if not the chief difficulty in the management of eccaleobions. He extended an invitation to amateurs to come to his office and avail themselves, free of charge, of any practical experience which he possesses."

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"*Digestion and non-digestion of different kinds of Food may and do become habitual.*—Habit is, according to Dr. Johnson, 'a power or ability of doing anything acquired by frequently doing the same thing,'

and, as no acts are performed more regularly than those of digestion, it does not seem unreasonable to extend the application of the law of habit to them. The nervous centres presiding over the process of digestion must, like other nervous centres, become educated by being repeatedly exercised in certain directions, and such powers as are the result of this process of education by frequent repetition, we are justified in calling habits. But it is not to the nervous centres alone that we must look for an explanation of these. As the different constituents of our food are operated upon by the secretions of different organs, the functional activity of those which have been most used in digestion will be greatest. Hence, most gastric juice will be secreted by the hunting tribes who consume large quantities of flesh; most saliva by the inhabitants of warm countries, a great proportion of whose food is starch; and most bile and pancreatic juice by the fat digesters of the Arctic regions. These considerations taken together explain what we here mean by habit. We shall find that these habits are governed by every variety of circumstance. In no two places, perhaps in no two individuals, are they exactly alike; but the most striking differences are to be met with in those who live under the most opposite conditions. Each nation has a dietary, more or less peculiarly its own, originating in the demands set up in the system by permanent surrounding agencies, and modified from period to period by the customs of the people and the alimentary resources of the country. The food of each country is preferred and most easily digested by its own inhabitants; on the other hand, disturbance of the digestive organs is usually the result of a change of country and diet. This holds true with regard to comparatively slight as well as to great changes. For illustrations of great difference in diet let us take the two following: We have the Esquimaux habitually consuming large quantities of fat, and showing a great dislike for starchy food—a typical digester of fats and non-digester of starch; and, on the other hand, we have the Hindoo living on rice and avoiding the rich hydrocarbons—an habitual non-digester of fats and digester of starch. In these, as in all other cases, we see that the desire for and digestion of different kinds of food are evidently regulated by surrounding agencies, operating through their influence on the chemical changes taking place in the body. But this is not all; for when a particular dietary has been called for and kept up for a considerable time, the functions of the digestive organs become so adapted to it, that, when the conditions giving rise to the necessity for it no longer exist, it continues to be desired and digested. Cases will occur to every one in which Esquimaux or Russians, etc., on going to a warmer climate, have continued to consume and digest unnecessarily large quantities of fatty substances, and have thus suffered greatly from the heat; and we have, on the other hand, the experience of our Arctic explorers, showing that many months have elapsed before such food as seal's liver and walrus blubber have become desirable, although they were from the first, as much as ever, demanded by the severity of the climate. The bilious attacks of Europeans on first visiting the tropics result from the still unbroken habit of fat digestion; and the phthisis from which negroes and monkeys suffer on going to a colder climate, is attributable to their habitual non-digestion of fat. Most national digestive habits are probably the result of special conditions operating for generations, and consequently, where the change is extreme, acclimatization has been pronounced impossible,

so difficult is it to break these habits. Individual habits, which are of shorter duration, may be more successfully combated. Hence the stubbornness of hereditary disease compared with the same when acquired."—(DR. DAVID J. BRACKENRIDGE, *Med. Times and Gaz.*)

"*Influence of Diet upon the Mother's Milk.*—The contradictory opinions that are entertained in respect to the influence of diet upon the quantity and quality of the milk, induced DR. SUBOTIN, of Petersburg (*Virchow's Arch.*, vol. xxxvi. p. 561), to institute a series of experiments to settle, as far as possible, the question. His investigations led him to the following conclusions: 1. That animal food increases the daily yield of milk, while a diet of vegetables diminishes it. Food of a fatty nature caused a marked diminution of the milk, and even, when persisted in, its entire suppression. 2. The character of the food had an evident influence upon the relative proportions of the several elements which enter into the composition of the milk. By an animal diet the amount of the solid matters was increased, and this increase was especially shown in an augmentation of fatty material. The increase of casein was less evident. The augmentation of these two substances in the milk was not merely relative, but absolute; the daily amount of milk secreted being increased by animal food. The proportion of its albuminous and saline ingredients underwent scarcely any appreciable change. Under the use of an animal diet there was not detected any large reduction of the saccharine matter of the milk, as Beusch supposed to occur. Neither was the opinion confirmed by the experiments of Drs. Beusch, Playfair, and others that the fatty constituents of the milk are augmented by a vegetable and diminished by an animal diet. By a change from an animal to a vegetable diet the quantity of the solid ingredients of the milk, namely, the fat and casein, was diminished, while the saccharine matter was somewhat increased. By fatty food the solid ingredients of the milk were but relatively increased, especially the butyraceous, while at the same time there was a decrease in the sugar. 3. The fact developed by the experiments of Dr. S., namely, that by animal food the quantity of butter in the milk is so much increased, would seem to prove that the fatty matter of the milk is formed, in a great measure at least, from the albumen."—(*Vierteljahrschrift f. d. Prakt. Heilk.* and *Amer. Journ. Med. Sci.*)

"*Stomatitis and Pharyngitis Leucæmica.*—In *Virchow's Archives*, DR. F. MOSLER relates the case of a male 40 years old, and previously of sound health, in whom, in the course of some fifteen months, there took place gradually a swelling of the glands on both sides of the throat, attended with inflammation of the mucous membrane of the mouth and pharynx, with flaccidity of and hemorrhage from the gums, followed by swelling of the axillary and inguinal glands, and finally of the liver and spleen. There was now an evident increase in the white particles of the blood. In the case described the only etiological agent to which the morbid phenomena it presented could be referred was inordinate exertion of mind and body. The condition of the throat was of especial interest. Its mucous membrane was red and swollen, and over its surface there were spread numerous medullary elevations having a smooth shining appearance. Both tonsils were enlarged, and their surfaces presented the appearance of a congeries of large, dense

medullary knots. The secretions of the surface of the mouth and larynx and of the salivary glands were greatly increased by talking. After a thorough rinsing of the mouth, its secretions gave an acid reaction. The patient had not suffered previously from any disease of the mouth or throat. The patient was attacked with this only after the lymphatic glands of the neck had become enlarged, and at first, with their increase or diminution the throat affection became worse or better. Finally, under the use of quinia and iron, remedies which exerted a beneficial influence on the entire morbid phenomena, the patient got well. Dr. M. believes that the form of stomatitis and pharyngitis here described is a specific disease resulting from a leucæmic dyscrasy. The inflammation of the mouth, which in its symptoms had a close resemblance to scorbutic stomatitis, was probably caused by an irritation due to some morbid chemical product in the blood and the secretions of the lymphatic glands, by which also, according to Dr. M., is to be explained the affection of the mouth met with in cases of diabetes, the nature of which is still, however, unknown."*—(*Centralblatt f. d. Med. Wiss.* and *Ibid.*)

"*Hypertrophy of Left Side of Face, probably from an Injury inflicted on the Fœtus in Utero.*—This case is related by Dr. Passeur in *Virchow's Arch.* It occurred in a boy 11 years old. When pregnant with him his mother was crushed against a wall by a loaded wagon, and experienced, in consequence, a severe pain in her abdomen, which continued for a long time afterwards. She was delivered at the normal period of a boy without mark or deformity. The child grew up a sufficiently large, robust, and well-nourished lad, with a normal conformation of skull. The face, however, commenced during infancy to acquire a high degree of deformity in consequence of a gradually increasing enlargement of its left half. The enlargement was not confined simply to the soft parts of the face, but involved also the left half of the tongue, the left facial bones, and the teeth of the left portion of the jaws. The lad's speech was but slightly affected; his intellectual faculties were well developed. No distorted or grotesque movements of the hypertrophied muscles were observable."—(*Vierteljahrschrift f. d. Prakt. Heilk.* and *Ibid.*)

Influence of Weather on Sickness.—"Dr. Ballard's nine aphorisms on the influence of weather upon sickness are thus given in his recent Report on the Health of Islington for 1867: '1. That an increase of atmospheric temperature is normally associated with an increase of general sickness. 2. That a decrease of atmospheric temperature is normally associated with a diminution of general sickness. 3. That for the most part the increase or decrease of sickness is proportional in amount to the extent to which the atmospheric temperature rises or falls. 4. That it is an error to suppose (as is popularly held) that sudden changes in temperature are (as a rule) damaging to public health. A sudden change from cold to hot weather is indeed very damaging; but a sudden change from hot to cold is one of the most favorable circumstances that can occur when sickness is regarded broadly as respects a large population. 5. That, remarkably enough, these influences are most marked in the directions I have mentioned in the colder seasons of the

* More probably due to starvation from defective nutrition and an insufficiency of the proper alimentary matter.—Z.

year, and more certain in the winter than in the summer. 6. That rises and falls of temperature are more certain and effectual in their special operation upon public health when at the same time the daily range of temperature is lessened, than they are when the daily range is at the same time increased; rises of temperature increasing sickness more certainly and markedly, and falls of temperature decreasing it more certainly and markedly. 7. That a fall of rain lessens sickness, generally, sometimes immediately, sometimes after a short interval, and that, as a rule, the reduction of general sickness is greater when the fall of rain is heavy than when it is light. 8. That drought, on the other hand, tends to augment general sickness. 9. That wet weather in the summer season operates more certainly in improving public health than it does in the winter season.'"—(*Med. Times and Gaz.*)

Health.—"But on the whole nine-tenths of our happiness depends alone upon health. With that everything is a source of enjoyment; while without it no outward good, of whatever sort it may be, is enjoyable. And even the other subjective blessings, the mental qualities, and disposition, and temperament, are abated by illness and very much embittered. Hence it is not without reason that we inquire before all things about one another's health, and hope it is good, for this is really the main thing for human happiness. And from this it follows that the greatest of all follies is to sacrifice one's health for any object whatever, for gain, for advancement, for fame, much less for sensual pleasures and transitory enjoyments. Rather ought we to subordinate everything to health."—(*Extract from Schopenhauer's Aphorisms, by J. H. Warner, in the Liberal Christian.*)

"*Transplanting in the Night.*—A gentleman anxious to ascertain the effect of transplanting at night, instead of in the day, made an experiment, with the following result: He transplanted ten cherry-trees while in bloom, commencing at four o'clock in the afternoon, and transplanting one each hour, until one in the morning. Those transplanted during daylight shed their blossoms, producing little or no fruit; while those planted during the darker portions maintained their condition fully. He did the same with ten dwarf pear-trees, after the fruit was one-third grown. Those transplanted during the day shed their fruit; those transplanted during the night perfected their crop, and showed no injury from having been removed. With each of these trees, he removed some earth with the roots. The incident is fully vouched for; and, if a few more similar experiments produce the same result, it will be a strong argument to horticulturists, gardeners, and fruit-growers, to do such work entirely at night."*—(*Boston Journal of Chemistry.*)

Reunion of Superior Maxillary.—It is stated in the *Boston Med. and Surg. Journ.* that "DR. DAVID W. CHEEVER exhibited to the Mass. Med. Soc. a patient from whom he had removed a naso-pharyngeal polypus ten months before, by a section, displacement, and subsequent *replacement* and *reunion* of the superior maxillary bone. The patient used his jaw six weeks after the operation, and was now well, without

* In view of the probability of this being correct, it becomes an important practical question in its bearings upon plastic surgery, whether the same rule holds good in the animal kingdom.—Z.

deformity. This operation was originated by Langenbeck and modified by Roux. It was the first time it had been done in this country."

"*Operation for Hare-Lip.*—Dr. J. L. Prentiss, of Lawrence, Kans., reports, in the *Leavenworth Medical Herald*, a successful operation for hare-lip by an original method, after an operation 'according to the usual manner' had failed on account of the 'great tension necessary to bring and maintain the cut surfaces in apposition,' 'owing to the large space to be closed or covered up and the insufficiency of material to cover it with.' The fissure in the bone, he says, was near a half inch in width, and there was a deficiency of more than one-third of the upper lip.

"The operation performed consisted of three stages. To supply the deficiency of soft parts, he dissected the cheek from the superior maxillary bone as far as the malar bone, and by means of a quill suture carried across and attached to the other cheek by adhesive plaster, he succeeded in 'sliding the tissues about a half inch toward the median line and retaining them until they had adhered in that position to the bone.

"The second part of the operation consisted in cutting through the external lamina of the superior maxillary and then bending the inner plate so that the partially severed fragment filled up the fissure. The edges were pared and the cut surfaces retained in apposition by a compress and adhesive plaster, thus securing union by the first intention.

"The third or completing stage of the operation consisted in the application of adhesive plaster in such manner (he used quill sutures instead of hare-lip needles) that 'all or nearly all of the tension came upon the adhesive straps, and the lips of the wound were brought together without anything to impede the circulation;' of course the edges of the fissure were pared in the usual manner, 'and a firm coat of collodion completed the operation.'

"Six days after, the sutures of silver wire were removed; two days later all the dressings were taken off, and 'union by first intention had taken place through the whole extent of the fissure.'"—(*Humboldt Med. Archives.*)

"*Non-uniting Fractures.*—Mr. Geo. W. Callender read a paper on this subject before the Royal Med. and Chirurg. Soc. After referring to the statements made by Amesbury and Hamilton respecting non-uniting fractures, the author relates a series of cases to show that the union of a broken bone is never prevented, although it may be delayed by constitutional causes. Instances are given of the repair of fractures in cases of recent and long-standing paralysis, and cases of non-union occurring during childhood are incidentally referred to. The results of the treatment of fractures at St. Bartholomew's Hospital during the past seven years are mentioned; also the history of a case of non-uniting fracture of the thigh, and cases of non-union from special local causes. It is concluded that three well-defined varieties must be enumerated of fractures which fail to unite: 1. Fractures, not inaptly termed spontaneous, which ensue from diseases of bone; in which it is evident that no union is likely to take place. 2. Fractures (*a*) with separation of the bone and periosteum to such an extent that there cannot be thrown out bone-material enough to fill up the gap between the fragments; (*b*) occurring through bones not provided with periosteum, when it is difficult to keep the broken ends together. 3. All fractures other than the

preceding; and in these cases, although union may be delayed, it never ultimately fails, except as the result of bad management of the injury. Several cases are narrated to show the effect of non-uniting fracture upon joint movements, and the treatment of those injuries where the thigh is the bone involved is briefly referred to. Cases are cited in illustration of the great length of time after the lapse of which a fracture, if properly treated, may be repaired, and the occasional good results from mere fibrous union are illustrated by pathological observations. The question of joint-stiffness after fractures is considered, and the importance of not interfering with such stiffness until the fracture is firmly united is insisted upon, and reasons are given for the presumption that such premature interference by the use of passive movements is a frequent cause of non-union. The following are the conclusions arrived at: Non-union of an ordinary fracture should never occur. Under careful treatment, bones will unite two years or longer after the occurrence of the fracture. It is reasonable to suppose that such fractures would have united at an earlier period if properly treated. Treatment of delayed union should consist—1st. In the improvement of the health, and in the avoidance of local obstructions to the circulation.* 2d. In placing the broken bone in the best position attainable. 3d. In leaving it at rest until it unites, its doing so being simply a question of time. 4th. In avoiding all attempts to overcome the stiffness of joints adjacent to, but not involved in a fracture, until the bone is firmly united; and this applies also to the management of fractures which unite in the usual time."—(*Med. Times and Gaz.*)

Neuroma.—We extract the following instructive observations from a notice of Virchow's Lectures on Tumors, in the *Brit. & For. Medico-Chir. Rev.*: "A neuroma is *a tumor composed essentially of hyperplastic nerve-elements*, with the addition of a certain quantity of connective tissue containing blood-vessels. The word nerve-elements is here used advisedly, in that nerve-cells as well as nerve-fibres may enter into its composition, and we may have a cellular or *ganglionic* as well as a fascicular or *fibrous* neuroma. Its first formation is in most instances exactly identical with the first formation of new nerve-tissue in the repair of a nerve after section, not by simple division of or outgrowth from pre-existing nerve-tissue, but by means of a young, newly-formed granulation-tissue (which, as we have seen in the previous reviews of this book, plays so conspicuous a part in the development of tumors generally), allied to the connective tissue, whose elements are afterwards developed into nerve tissue. The closeness of the link which connects the tumor under consideration with regenerating nerve-substance is seen in the '*amputation neuroma*,' as good a type as can be brought forward of the *fibrous neuroma* in general. This bane of surgeons, the painful swelling of the nerves in stumps, was only at a comparatively late period found to contain an abundant supply of nerve-fibres in a dense, close-meshed net-work, prolonged into it from the trunk of the affected nerve. A continuity of the nerve with the tumor is evident in all cases: nowhere is the tumor set or imbedded in the nerve-end as the myoma in the uterus. Both kinds of nerve-fibre, the gelatinous or gray, as well

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* But more especially in supplying a sufficiency of the saline or solid constituents of bone—as, for instance, the phosphate of lime, to insure reunion.—Z.

as the tubular or white, are found in the fibrous neuroma—one of the many discoveries in pathology to the credit of which Virchow is justly entitled. Many of the so-called '*painful subcutaneous tumors*' are to be included among the neuromata, especially those which are remarkable for their hardness, which lie loose in the subcutaneous tissue, and vary from the size of a pea to that of a bean. One such tumor examined by Virchow was found to consist almost exclusively of nerve-fibres. They are generally met with on the extremities, are connected with the finest terminal branches of the nerves that ramify there, and are far more common in women than men. They are easily and successfully extirpated. At the same time it must be remembered that all the painful subcutaneous tumors described cannot be regarded as neuroma; for small subcutaneous tumors of any kind, muscular, vascular, etc., will, provided they involve in their growth some one or more nervous branches —and it is the small, sensitive, cutaneous branches which are particularly open to such impressions—give rise to the same painful symptoms as the true neuromata. As regards the origin of the amputation neuroma, there can be no doubt that the tumor is a direct consequence of irritation. In like manner many of the subcutaneous neuromata can be traced to blows or other injuries, so that the 'Reiz' holds sway here as elsewhere. Other kinds there are, however, which are not so readily accounted for, but have a more decidedly constitutional character. Such are the 'multiple neuromata,' where a single nerve is, throughout the whole of its course, beset with little strings of tumors, like the beads on a rosary, or where many nerves throughout the body are similarly affected. This disease is not only hereditary, but often, also, congenital. It seems to bear some peculiar relation to idiocy and cretinism, in connection with which it is often found present. So general is it in some cases, that even the sympathetic does not escape, but is, like the spinal nerves, swollen with tumors. The above neuromata, the greater part of which are accessible to the surgeon, and of which the amputation neuroma is, speaking generally, the type, resemble on section fibromata or fibro-myomata, being white or yellowish-white, lobular, with a compact fibrous grain, and having occasionally their outer layers superimposed one upon the other in a concentric form like an onion. . . . . . . The nerves of common sense are much less often the seat of tumors than the spinal nerves; but the auditory is sometimes so affected. There is, however, no recorded instance of neuroma in the olfactory or optic nerves. Neuromata are, as a rule, local and benign tumors; they behave in their manner of life more like some natural structure of the body than tumors, being small, of very slow growth, and but little subject to degeneration or other changes; nor do they ever manifest infectious properties."

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"*Neuritis.* By J. Fayrer, M.D., F.R.S.E., Senior Surgeon to the Medical College Hospital, Calcutta, and Professor of Surgery in the College.—On April 27th, 1867, I was asked by a medical man to see a native gentleman, aged about 30, who had been suffering severely for the past three months from a painful affection of the left hip, which had confined him to bed. He informed me that about three months ago he had been salivated for a venereal affection, and almost immediately afterward the pain in the hip made its appearance. During this period he has had several attacks of irritative fever which have reduced him very much. The pain is so severe and constant that he is unable to

sleep. Blisters had been applied over the seat of pain, and many remedies, including iodide of potassium, used without benefit. There was no shortening of the limb, no pain in the knee or hip joint, or when the sole of the foot was smartly struck with the hand; but there was great pain in the course of the sciatic nerve in the gluteal region, and especially at one point, where I thought, after long and careful examination, that I could detect deep-seated fluctuation, with fullness and induration in the course of the nerve. There was also some tenderness on pressing deeply in the iliac region. It occurred to me that there had been inflammation in, and that the symptoms were due to effusion into, the sheath of the nerve. It is to be observed that he had been previously a healthy man, and not subject to sciatica or rheumatism. I made a puncture with a long narrow knife down to this indurated part, and gave exit to more than half an ounce of clear serum. The removal of tension caused by the fluid was followed by immediate and almost perfect relief. I did not see him again, but on the 10th of the following month I heard from the medical man who had consulted me as follows:

"'Dear Sir,—The patient was so much relieved by the puncture that he could get up from his bed and walk about the room. He left Calcutta for his home two days after we saw him. Yesterday I have been informed that he is doing well there. Yours truly, * * * *.'

"On May 30th, I was informed that the patient was quite well and free from lameness.

"*Remarks.*—This is the only case of the kind that I have met with, but I should more carefully look for this effusion within the sheath of the nerve, in future cases of sciatica that may come under my observation. It is possible that this may have been due to the attack of syphilis, or to the mercury which he took to salivation for its cure. But as there was no other evidence of constitutional syphilis, and as iodide of potassium had no effect on the disease, I am inclined to think it was not traceable to this specific origin, but that it was the result of simple inflammation of the neurilemma. The relief afforded by the incision was very great, and, from the accounts I have since received, it has been permanent. The pathology of this affection is interesting, and though the case is a minor one, I have thought it worth recording."—(*Med. Times and Gaz.*)

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"*Neurine formed Synthetically.*—In a memoir quite recently presented to the French Academy, M. Wurtz communicated some further researches on this point. He has now succeeded in demonstrating that the synthetical neurine is identical with that prepared from ordinary brain substance. He bases this identity on the fact that the chemical reaction and crystalline form of the two substances are exactly the same."—(*Ibid.*)

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Neuralgia and Diarrhœa cured by Hypodermic Injection of Morphia.—"Dr. Samuel York, of Lewiston, Maine, writes to us that he injected one-ninth of a grain of acetate of morphia into the arm of a soldier for neuralgia of the trifacial nerve. The patient had been suffering for ten months with chronic diarrhœa, pronounced incurable. Singularly enough, not only did the neuralgic pain at once cease, but the diarrhœa also, and he has remained ever since in good health."—(*Med. and Surg. Reporter.*)

"*Death from Nicotine.*—A case of death from nicotine recently occurred at Cohoes, N.Y., under the following circumstances: The father of a little girl, in an endeavor to 'heal a sore on her lip,' applied to it the contents of a 'rank' pipe-stem. The victim was almost immediately seized with the peculiar symptoms of tobacco-poisoning, and died a few hours afterward."—(*Med. Record* and *Boston Med. and Surg. Jour.*)

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"*Poison of the Cobra.*—DR. SHORTT has recently explained in a very satisfactory manner how it happens that the most inert substances have come to be regarded as possessing antidotal properties against the action of the cobra poison. The snake-charmers, the moment they capture a cobra, extract his fangs, and often cut out the poison gland. The fangs are often reproduced, and a snake under these circumstances may bite and draw blood even, and yet not eject poison. Dr. Shortt saw a snake recently at Malabar, and found a small cicatrix at the base and a little beyond the fangs, and a more careful examination discovered that the poison gland had been removed. This operation was done once a month, the fangs being left unmolested. One can readily imagine how remedies applied to wounds inflicted by such a snake would be thought to possess special preservative powers. In a letter to the *Madras Times*, Dr. Shortt refers to some experiments with strychnine, as follows:

"'I inoculated a dog with a small quantity of the cobra poison, and Dr. Nash injected hypodermically a solution of sulphate of strychnine, 1-30th of a grain. This was done almost immediately after the inoculation by the poison, and Dr. Nash continued his treatment throughout; and when I left the place, some twenty-four or thirty hours after, the animal was alive. From first to last there was no evidence of the action of the poison. Dr. Nash says that the dog was ill during the night, and I believe the animal is still alive. It was Dr. Nash who suggested the use of strychnine originally, and it fully deserves further trial, as the action of the cobra poison is exactly the reverse of that of strychnine. It is possible that strychnine may possess antidotal properties for the cobra poison worth discovering. Dr. Nash hopes to make further trials, and I hope to be able to do so myself soon.'"—(*The Lancet.*)

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"*Venom of Toads.*—The toad, formerly considered a redoubtable being, possesses in reality a venom capable of killing certain animals and of injuring man. This venom is not, as was believed, exhaled by the mouth; it is a sub-epidermic cutaneous secretion, which acts powerfully if the epidermis is abraded at the moment of contact. In fact, dogs who bite toads soon utter howls of pain; on examining them, the jaws and tongue are found swollen, with flowing of a viscid fluid. The smaller animals on whom the venom acts, experience a true narcotic poisoning, soon followed by convulsions and death. The experiments of MM. Gratiolet, Clöez, and Vulpian have shown that the humor oozing from the parotid region of toads becomes a true poison when it is introduced into the tissues. A tortoise of the species Testudo Mauritanica, pricked in the hind foot, was completely paralyzed at the end of a few days, and this paralysis continued several months. Certain savages employ, instead of curara, in South America, the acid liquid from the cutaneous glands of the toad. This venom exists in sufficiently great quantity on the back of the toad. Treated with ether, it is dissolved, leaving a residue; the evaporated solution gives oleaginous granules. This residue possesses a toxic power sufficient to cause

even after complete desiccation, the death of a small bird."—(*Journal de Chimie Med.* and *Boston Med. and Surg. Jour.*)

"*Continuous Electrical Currents in the Treatment of Suspension of Vital Actions caused by Chloroform.*—MM. ONIMUS and LEGROS, after examining the effects of constant electrical currents on the heart and its nerves, were led to believe that such currents might prove efficient in stimulating the heart's action after its paralysis by chloroform inhalation. They have, accordingly, carefully investigated the subject (*Comptes Rendus*, Mars 9, 1867). They assert that in chloroform syncope there is more or less paralysis of the muscular fibres of the heart. The means hitherto recommended to treat this condition, such as artificial respiration, flagellation, and aspersion with cold water, are insufficient, as they do not directly influence the muscular action of the heart. Interrupted currents of electricity should not be used, as they diminish and even stop the respiratory and cardiac movements. The value of continuous electric currents was tested by experiments on dogs, rabbits, rats, and frogs, in the following manner: A rat was placed under a glass cover along with a sponge saturated with chloroform. Its respirations gradually became jerking, and, in one minute, they had nearly ceased, while the animal was now completely anæsthetized. It was left for thirty seconds longer under the glass cover, and, after being withdrawn, it was left untouched for another thirty seconds. No cardiac action was now perceptible. A continuous electric current was then passed from the rectum to the mouth; nothing was observed for several seconds, when the heart's beats reappeared, and then imperfect respiratory movements occurred, which, by-and-by, became quite normal. The electralization was now stopped, and the animal gradually recovered. Even when left for two minutes in a state of apparent death, the application of a continuous current resuscitated the animal. If an interrupted current were employed in place of a continuous one, death always occurred; but if the former had been employed for only a short time, life could still be restored by the use of a continuous current. The experiments on frogs were of great interest, as the various stages of the effects could be distinctly recognized, especially if the heart were previously exposed. As the exhibition of the anæsthetic was continued, the beats diminished in force and number, and then ceased; if a continuous current were now used, the beats recommenced. A frog was left to itself for twenty-four hours after complete chloroform anæsthesia; the heart was then quite immobile, and although a continuous electric current could not cause any contractions of the voluntary muscles, it caused a renewal of the heart's action."—(*Journal of Anatomy and Physiology* and *Amer. Jour. Med. Sci.*)

"*Pyrethrum Roseum, a Specific against Noxious Insects.*—A well-known German traveler, F. JAGER, in his *Sketches of Travels in Singapore, Malacca,* and *Java* (Berlin, 1866), describes the powder of the Pyrethrum roseum as a specific against all noxious insects, including the troublesome mosquitoes and those which attack collections. He says: 'A tincture prepared by macerating one part of the Pyrethrum roseum in four parts of dilute alcohol, and, when diluted with ten times its bulk of water, applied to any part of the body, gives perfect security against all vermin. I often passed the night in my boat on the ill-reputed rivers of Siam without any other cover, even without the netting, and expe-

rienced not the slightest inconvenience. The 'buzzing,' at other times so great a disturber of sleep, becomes a harmless tune, and, in the feeling of security, a real cradle-song. In the chase, moistening the beard and hands protects the hunter against flies for at least twelve hours, even in spite of the largely increased transpiration due to the climate. Especially interesting is its action on that plague of all the tropical countries, the countless ants. Before the windows, and surrounding the whole house where I lived at Albay, on Luzon, was fastened a board six inches in width, on which long caravans of ants were constantly moving in all directions, making it appear an almost uniformly black surface. A track of the powder several inches in width, strewed across the board, or some tincture sprinkled over it, proved an insurmountable barrier to these processions. The first who halted before it were pushed on by the crowds behind them; but, immediately on passing over, showed symptoms of narcosis, and died in a minute or two; and within a short time the rest left the house altogether.'"—(*Brit. Med. Jour.* and *Med. News.*)

"*Collodion in Treatment of Nævus.*—Prof. L. S. JOYNES, of the Medical College of Virginia, publishes in the *Richmond Medical Journal* a case of nævus successfully treated by the continued daily application of collodion. 'The contraction which ensued upon the drying of the liquid was remarkable. The prominence of the discolored portion of the cheek disappeared; the integument all around was strongly puckered, and through the coating of dried collodion the discoloration was seen to be much diminished. The application seemed to cause not the slightest pain or inconvenience to the child.' Possessing, as it does, the advantages of causing *no pain* and leaving *no scar*, the remedy, even though success would be but the occasional result, should receive a fair and full trial before resorting to more active operative proceedings, as the caustic, knife, ligature or seton."—(*Humboldt Med. Archives.*)

"*Styptic Paper.*—M. GUSTAVE GABILLON, of Paris, has discovered a method to render more effectual and convenient of application, and, at the same time, preserve the hæmostatic properties of perchloride of iron, or, as it is sometimes called, muriate of iron. It is well known that this substance possesses these properties in a high degree, and paper, or any tissue prepared with it, instantly stops bleeding when applied to wounds. It is inconvenient to carry about the solution of ferric chloride, nor is it easy to apply it. M. Gabillon's invention consists in his method of making and preserving the paper. He first dries, and then coats the paper or other tissue used with a protecting composition, to prevent its destruction by the perchloride of iron. The method of application is as follows: the paper is first dipped in a solution made of one pound of gum benzoin of the first quality, one pound of rock alum, four and a third gallons of water; this mixture is heated in a vessel, carefully tinned inside, up to the boiling point, and the solution is to be kept boiling for four hours, and skimmed from time to time. The water evaporated is to be replaced by the same quantity of fresh water, and, as soon as the solution is cooled, it is to be filtered off. The paper or tissue is then dipped into it, and to be kept there till sufficiently saturated; it is then to be carefully dried. When dry, a solution of perchloride, in a more or less concentrated state, is applied by a brush or roller. The paper or tissue thus prepared is folded up and preserved

from the action of the air by wrapping it in a piece of waterproof taffeta, prepared with the addition of resinous substances, and in this manner it can be preserved any length of time in a state always ready for use."—(*Student and Intellectual Observer.*)

Diversity of Organs in Crustacea.—"The diversity of organs among the Crustacea is almost endless; what serve as jaws in one division are legs in another; the antennæ in one may be organs of sense, in another of locomotion or of prehension: then there are thoracic branchiæ in some (Decapods), sac-like branchial appendages in others (Tetradecapods); while the Entomostraca rarely have any true branchiæ, the surface of either some part or of the whole of the body serving for aeration.

"In the Crabs, which present the condition of highest centralization for the Crustacea, the three front segmental elements are coalesced and modified as the organs of feeling, sight, and hearing; the next six supply the mandibles, maxillæ, and palpi for the mouth; five are devoted to the organs of locomotion and prehension; and the remainder are lost in the abbreviated abdomen or tail-piece. In the other Decapoda (with ten limbs) also, such as Lobsters, etc., *nine* segments and their pairs of appendages are thus concentrated into the organs of sense and the mouth In the Tetradecapoda (with fourteen limbs), such as the Woodlouse, etc., only *seven* segments are concentrated for these cephalic organs. In the Entromostraca, only *six* thus coalesce for the senses and mouth in the *Cyclops* group, only *five* in the *Daphnia* and *Caligus*, and only *four* in *Limulus*."—(RUPERT JONES, *Quart. Jour. Micros. Sci.*)

"*Wolf-teeth in Horses.*—We notice occasionally in agricultural papers, and find not infrequent mention in our correspondence, something about wolf-teeth as affecting the sight of horses. This is an ancient prejudice, and entirely without foundation in fact. The name wolf-teeth is given to small, supernumerary teeth, which occur occasionally in the mouths of horses, and are situated commonly in the upper jaw, but sometimes in the lower, just in front of the first grinding tooth. They are most usually noticed in the mouths of colts, and when the permanent teeth come are almost invariably crowded out, and thus shed are not renewed. Sometimes the root of one of the milk-teeth is not absorbed properly, but crowded inward, where it remains, and is called also a wolf-tooth. This may cause the horse considerable inconvenience. A third application of the name is to points or edges of teeth not ground off by the action of the teeth upon each other in chewing and biting, when these points become so long or sharp as to cut the tongue or lips. It is an absurd prejudice (for which, however, the ancients are responsible) that attributes diseases of the eye to the supernumerary teeth above mentioned. There is not the least foundation for such a view. The wolf-teeth may remain, or they may be taken out without fear of any evil influence upon the sight of the animal. If not shed, they may be a nuisance, and are always a deformity, and may very properly be removed. This is easily done by an oak pin of convenient shape placed against the tooth and struck a smart blow with a mallet. The sharp angles or edges caused by unequal grinding are best filed away."—(*Am. Agriculturist.*)

"*Characteristics of the Different Varieties of Creasote.*—Beechwood creasote gelatinizes with its volume of collodion. Creasote from coal (carbolic acid) does not.

"Wood creasote is insoluble in ammonia, and gives, with excess of potash, a turbid solution.

"Carbolic acid from coal is insoluble in cold ammonia, but dissolves on the application of heat. It also gives a clear solution with weak liq. potassæ.

"With a neutral solution of perchloride of iron, wood creasote dissolved in alcohol gives a green coloration, the coal-tar product, brown.

"With aqueous solutions, on the contrary, cold creasote furnishes a blue."—(*Med. Press and Circular*)

Capillary Chemistry.—"M. BECQUEREL has published a paper on electro-capillary phenomena. Having previously shown that when a slip of filtering paper is placed between two glass plates, in order to effect the slow efflux of a metallic solution contained in a vessel dipping into another solution, the electro-capillary action is rendered more easy. The author illustrates this fact by a variety of experiments. Thus, if moist persulphuret of iron be deposited on a copper lamina placed between two glass ones, and if the borders be covered with putty to prevent the entrance of atmospheric air, the sulphuret of iron will be gradually decomposed, sulphuret of copper will be formed, and iron in a metallic state will be deposited here and there, and this effect is attributable to electro-capillary action."—(*Paris Correspondent of Chicago Med. Jour.*)

"'*Minargent*' is the name given to a new substitute for silver, which is said to possess nine-tenths of its whiteness, malleability, ductility, tenacity, sonoroüsness, and density, while it has a superior metallic lustre, wears better, is less likely to be acted upon by sulphur in its various forms, and is less fusible than silver. The chief features of this wonderful alloy consist in the introduction of pure tungsten and aluminum, also the considerable proportion of nickel which the inventors have been enabled to alloy with aluminum notwithstanding its known want of affinity therewith. Minargent is composed of 1000 parts copper, 700 parts nickel, 50 parts tungsten, and 10 parts aluminum. The first three elements are melted together, then run off in a granulated form, and again melted, adding the aluminum and about 1½ per cent. of a flux composed of one part borax, and one part fluoride of calcium; these proportions of borax are reduced as the fusion proceeds."—(*Sci. Amer.*)

Steel formed by Friction.—"At a recent *conversazione* of the London Institute of Civil Engineers, a curious process for manufacturing steel by friction was explained and commented upon. By the aid of machinery pig iron is ground to powder by a rapidly moving cutter. The great amount of friction generated produces a heat so intense that the iron is set on fire, and, after scintillating, falls down as reddish-brown dust, the combustion having caused the riddance of the superfluous carbon. The dust is collected, put into a crucible, melted, and when cooled is found to form ingots of steel of superior quality."—(*Ibid.*)

"*Rouge—Its Composition and Uses.*—In the mechanical arts rouge is used for polishing purposes. It is entirely different from the cosmetic known by the same name, which is a vegetable preparation and

used only for the complexion. But the rouge used by machinists, watch-makers, and jewelers is wholly a mineral substance. In its preparation crystals of sulphate of iron, commonly known as copperas, are heated in iron pots, by which the sulphuric acid is expelled and the oxide of iron remains. Those portions least calcined, when ground, are used for polishing gold and silver. These are of a bright crimson color. The darker and more calcined portions are known as crocus, and are used for polishing brass and steel. For the finishing process of the specula of telescopes, usually made of iron for large instruments—although lately cast of steel—crocus is invaluable; it gives a splendid polish. Lord Rosse prefers for the production of rouge the peroxide of iron precipitated by ammonia from a dilute solution of sulphate of iron, which is washed and then compressed until dry. It is then exposed to a low red heat and ground to powder."—(*Ibid.*)

"*New Lamp.*—The French, who were always strong in 'lamps,' have lately brought out a new invention, which is said to be as brilliant as the oxy-hydrogen and lime lights, while it has the recommendation of being much less costly. Coal gas, intimately mixed with air, is urged with gentle pressure along a tube, and made to pass through a metallic plate, pierced full of minute holes. By this means a vast number of jets are obtained, which, after being driven through a fine tissue of platinum wire, are lighted in the ordinary way. The platinum soon acquires a white heat, and gives out so brilliant a light that it cannot be supported by the naked eye. About one metre of gas is consumed per hour. It is called the *Bourbouze* lamp."—(*Oil Trade Review* and *Chemical News.*)

Cutting Glass.—"According to LES MONDES, the use of hot air or gas for cutting glass is a new and useful invention already utilized by the Crystal Company of Balcarat. The hot gas issues from a pointed or flattened tube, and is driven directly upon the goblet or other object to be cut, which is placed in close proximity to the tube, and made to revolve upon its axis. A narrow circle of heated glass is thus formed upon the object in question, which, being damped immediately afterward, causes the glass to divide with extreme neatness at the part thus heated. The operation is more rapid and effectual, we are told, than any means hitherto employed for this purpose."—(*Amer. Artisan.*)

To Harden Plaster of Paris.—The *Scientific American* says that if plaster of Paris is mixed with water from quick-lime and a little glue, it will be less liable to crack than with pure water.

BIBLIOGRAPHICAL.

Lessons in Physical Diagnosis. By ALFRED L. LOOMIS, M.D., Professor of the Institutes and Practice of Medicine in the Medical Department of the University of New York, Physician to Bellevue and Charity Hospitals, etc. New York: Robert M. De Witt. Received through Lindsay & Blakiston.

This is a plain, practical, and comprehensive compend of physical diagnosis, and a reliable guide to the proper discrimination of the disorders of the lungs, heart, and abdomen. It is gotten up in excellent style, the typography, illustrations, paper, and binding being attractive to the student and creditable to the publisher.

THE

DENTAL COSMOS.

NEW SERIES.

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ORIGINAL COMMUNICATIONS.

AMERICAN DENTAL ASSOCIATION.

BY J. H. M'QUILLEN, M.D., D.D.S.,
PROFESSOR OF PHYSIOLOGY IN PHILADELPHIA DENTAL COLLEGE.

Attracted by the grand and impressive scenery of Niagara, whose surging rapids and stupendous falls create an ever-pervading feeling of awe in the mind of the beholder, and who, in leaving its attractions, does so with the most painful feelings of regret, and a longing desire to return at the earliest moment possible, the members of the *American Dental Association* assembled on July 28th, 1868, for a third time within less than ten years, at this favorite spot, with the view of holding the eighth annual meeting of the Association. This fact warrants a retrospective, a present, and a prospective view of the organization. Nine years before (1859), *twenty-six members* of the dental profession, representing *eight local* societies and *two dental colleges*, here met together in response to a memorial calling for such a meeting, with the object of forming an association upon a representative basis, to be composed "*exclusively of practitioners of dentistry*, holding their appointment to membership either as *delegates from local institutions* or as permanent members." This extract from the constitution (which was there offered as a plan of organization, and adopted the next year at Washington, with only a few unimportant modifications) expresses in the most concise and explicit language the basis upon which membership with the Association can alone rest.

An impression had been created in the minds of some members of the profession that the object of this meeting was to change the character of the American Dental Convention into a representative body, and in anticipation of that, a meeting of dentists was held in the *City of* New York (in June, 1859), at which a series of resolutions were adopted expressing entire confidence in the Convention, and concluding with the following:

"*Resolved,* That it is the duty of every dentist who desires the advancement of the profession to attend the Convention at Niagara Falls, *and use his influence against any action tending* to dissolve the American Convention, *or to create any delegated organization.*"*

No such object as changing the character or dissolving the Convention had been contemplated. And while those who were not satisfied with its proceedings had a right to stay away from the meeting, the right of others to *prevent* them from forming an association more in accordance with the demands of the age was not so well grounded, and the framers of this resolution no doubt recognized this fact, after reading an editorial on the subject by the writer in the first number of the DENTAL COSMOS; for when the *American Dental Convention* and the *delegates* to the Representative Convention assembled at the same place, but at different hours, no attempt was made on the part of either body to *interrupt the harmony or invade the rights of the other,* but each attended to its own affairs, and then adjourned. The Association so increased in size, and exerted such a salutary influence upon the profession throughout the country, that when it again met at its place of nativity, Niagara, five years after, in 1864, *seventy-seven delegates* were present, representing *twenty-four local societies* and *three dental colleges.* Four years later, in 1868, the Association again returned to the much-loved spot, with the delegates numbering *one hundred and forty-three,* and representing *thirty-eight local societies* and *eight dental colleges,* located in various sections of our wide-spread country. In the brief period of nine years, the local societies and colleges in the country have increased almost *sixfold,* being only *ten* in 1859, and *fifty-eight* in 1868.† That this Association was mainly instrumental in inducing the formation of these societies no one will have the presumption to deny, for membership in it could only be gained, according to the constitution, by *practitioners* of dentistry coming as delegates from *local societies.*

In the intervening years, the Association had held its meetings in different cities, and, owing to a strict observance of the constitution, they had been characterized by harmony and order. The reports of committees, and volunteer essays, it is true, frequently led to animated discussions, in which very decided differences of opinion would be presented upon scientific or practical points. These contests, however, were invariably productive of benefit to those engaged in them, and the profession at large, for from them the truth (scientific or practical) was invariably evolved, and they were forcible illustrations of the *harmony of antagonisms.* As the centripetal and centrifugal forces acting and

* New York Dental Journal, July, 1859.

† See list of fifty local societies, exclusive of the eight dental colleges, in *Dental Register,* Aug. 1868.

reacting upon each other keep the planets in their orbits; as the flexor and extensor muscles of the arms and legs acting in opposition to each other move the limbs, so too, opponents in discussing a question arrive not only at more correct and extended knowledge of the subject than if they had never been engaged in an intellectual contest with each other, but, in addition, the cause of science may be served by the evolution of some new facts as the result of the amicable conflict, proving, in this way, that an antagonist is a helper, by not permitting one to remain superficial, but compelling a thorough and exhaustive analysis of the subject.

No successful attempt had been made to violate the constitution during these years, and the Association, under the temperate influence of its founders and supporters, had increased in strength and numbers in a most unprecedented manner. For the first time this was unfortunately consummated at the recent meeting at Niagara, by the admission of representatives from the American Dental Convention, an organization that can make no just claim to be regarded as a local society, and which, in addition, is so lax in its requirements that any one, on the payment of one dollar, can become a member, and whose many shortcomings, years ago, induced the establishment of the American Dental Association. As an illustration that no discrimination is exercised with respect to the admission of members, it is only necessary to direct attention to the fact that at the meeting of the Convention held some years ago, provision was made by which persons engaged in the manufacture of the various articles used by the profession were made eligible to membership. Admitting the right of the Convention to representation opens the door to these.

In addition to this, a delegate was received by the American Dental Association from one of the local societies, who although formerly engaged in the practice of dentistry in a neighboring State, is now occupied in the manufacturing of artificial teeth, and keeping a dental depot for the sale of materials furnished to the profession by such establishments, and who came to the Association making a display of his wares. There can be no possible objection, but, on the contrary, there may be much advantage to members of the profession, whose residences are far removed from the great centres of trade, in being brought in contact with manufacturers at these annual gatherings, and in having an opportunity of examining samples of their stock, but they have no right to force themselves into the Association as members, for they come there on account of individual interest, not to advance the objects of the Association. As will be found by the report of the proceedings, two committees appointed by the Association directed attention to these irregularities, but without avail.

Thus, in two cardinal points, the constitution was violated, in fundamental principles on which the Association is based. In drafting the plan of organization nine years ago, the aim of its founders was to

confine its memberships to those engaged "*exclusively* in the *practice of dentistry*," so that the Association might not be used, as other organizations had been, by persons outside of it, for the advancement of individual interests; and the clause in the constitution relative to membership, quoted above, is so clear that no one can possibly mistake its meaning. Again, a primary object in organizing the Association was to encourage the formation of local societies all over the country; the success attending the efforts in that direction has already been referred to. The recognition on the part of the Association of a migratory body like the Convention, with no local habitation, and so lax in its regimen that any one can become a member, be he good, bad, or indifferent, in place of promoting, is calculated to discourage the formation of additional local societies.

Appreciating, to the fullest extent, these facts, it is not surprising that those who were most active in *organizing* and *supporting* the Association, embracing, with few exceptions, those who have attended its meetings year after year, and whose contributions to its transactions have given a scientific character to them, should have opposed, to the best of their abilities, the disorganizing influences brought to bear upon it by the utter disregard of constitutional obligations, in subverting the very genius of the organization. That this was willfully and deliberately planned is a supposition not to be entertained for a moment, but rather to be attributed to errors of judgment; for the persons sent as delegates, although representatives of an organization that had no just claim there, were gentlemen of irreproachable character. If, however, they had deliberately conspired to impair the harmony, violate in every particular the fundamental principles upon which the Association is based, and even place its very existence in jeopardy, they could not have adopted a more effectual course than the one which was pursued by their supporters in insisting upon admission to representation, and most unjustly and ungenerously imputing improper motives to those who were defending the rules of the Association. As evidence that there was nothing personal in the opposition, the right of these gentlemen to come into the Association as representatives of *local societies* to which they belonged was freely admitted and urged. Unfortunately, more than half of the members present were new men, unacquainted with the constitution, who, in the course of the discussion, were informed by a wiseacre, who has become a member within the past three years, that it had never been adopted,—a most absurd statement, which has no foundation in fact, as those who participated in the framing and adoption of the constitution can testify, and which only a mind of the smallest possible caliber would make, in relation to an instrument which terminates as follows: "In acknowledgment of having *adopted* the foregoing propositions, and of our willingness to *abide by them, and*

use our endeavor to carry into effect the objects of this Association, as above set forth, we have hereunto set our names." This has been signed by every one who has joined the body, from the organization of the Association at Washington down to the present time.

Failing to appreciate the exact basis and objects of the Association, and having had their sympathies excited for the applicants by statements on the part of some of the speakers that the opposition was purely of a local and personal character, it is not surprising that the votes of these new members should have decided the question adverse to the constitution and the wishes of the older members. As it was, the vote was a close one, standing 56 for, to 51 against, admission—a large number of the members not being present at the time. An important question such as this should have been decided by the *yeas* and *nays*, a plan which not only demonstrates beyond a question of doubt the numerical strength of each party, but also shows where each member stands. Had it been adopted in this case, it is more than probable that the result would have been different, for after the decision, an exception being taken to the ruling of the chair, on the following day, in relation to the admission of delegates from Canada, a call was made for the yeas and nays, and not only a different result was obtained, but, in addition, the fact was clearly demonstrated that a number of persons had voted on the previous day without having paid their dues, for the calling of the roll had to be suspended until that could be accomplished. Many of those whose votes had aided in securing the admission of the delegates, regretted their hasty action afterward, but they felt that it would not do to reconsider it. And yet, strange to say, some of these gentlemen had but recently been engaged in securing the passage of *State laws* of the most *stringent character* for the *regulation of the practice of dentistry,* came to this Association, which had been largely instrumental in bringing the profession up to a standard that enabled them to accomplish their objects, and aided in the violation of its fundamental principles. That this was done by some of them in ignorance of the genius of the organization, is a fact admitted, not only in private, but also in public, by an old and leading member of the profession.

A common mistake with respect to the Association is to regard it merely as an annual gathering of the profession for an interchange of views on scientific and practical matters connected with the principles and practice of the profession. This is a prominent and important object; but in addition, as a *representative* organization, it partakes somewhat of a *legislative* character, whose *suggestions,* not to say rulings, affect the *present* and the *future prospects* and welfare of the profession. Each delegate attends, not merely in his individual character as a member of the profession, but also as the *representative* of the interests of the society which sends him, and of the

profession at large. Under such circumstances, as a legislator, he has nothing to do with personal considerations, and when such points are raised, and the motives of men are called into question, as they are too apt to be on all occasions by some parties, it is but proper to infer that the suspicious man may be justly suspected. "To the pure all things are pure," and those who are ever ready to impute improper motives to others, criminate themselves by their utterances, in the minds of high-toned and honorable men, who, knowing the purity of their own impulses, are slow to doubt or call into question the motives of others.

To advance and elevate the standard of education; to promote a desire for scholarly acquirements, and scientific research on the part of individual practitioners; to raise and maintain the practice of dentistry to the dignity of a liberal profession—these are objects of the Association, and an all-important aid in this effort would be the formation of additional local societies in sections of the country where as yet they have not been established. No mass convention, willing to take in any one, however unfit to practice the profession,—no exclusive national association, composed of leading members of the profession, however eminent or active they may be, can accomplish this end. It is the work of an association founded, like our own, upon the beneficent principles of the representative government of our own great and glorious country, holding out the highest inducements and affording the fullest recognition to every honest and faithful worker in the republic of the profession. As efforts have been made to overturn the plan of goverment of our beloved country, so too similar efforts may be put forth to destroy this organization; but the time has not yet come when that can be consummated. And, after dispassionate examination and calm deliberation, it is not probable that the local societies will indorse actions so subversive of the objects of the Association and the interests of the profession at large.

LIQUID PROTOXIDE OF NITROGEN.

BY THOMAS W. EVANS, M.D., PARIS, FRANCE.

THE inconvenience of making protoxide of nitrogen, the bulkiness of the gas, and the consequent occasional difficulties of transporting it, are facts which will probably cause many persons to doubt the expediency of adopting this new anæsthetic as a substitute for chloroform and other moré accessible and portable anæsthetic agents.

Admitting the gravity of these objections, I have always felt that when once the great value of the gas, its superiority in many respects to chloroform, had been faithfully proved, much might be done to overcome the practical difficulties connected with its general administration.

Protoxide of nitrogen has been commonly made by those having oc-

casion to use it. Each dentist has been his own manufacturer, employing such apparatus and such means as he could best command, while the gas has rarely been made in quantities exceeding sixty gallons, at longer or shorter intervals, according to the special necessities of the operator. The time occupied in making the gas has always been considerable; and the cost of materials purchased in small quantities, together with the loss from accidents, such as the breaking of retort, etc., has made it quite impossible to obtain the gas as easily and economically as is to be desired.

The gas can, however, be produced much more cheaply than by the methods now employed, and at the same time the dentist himself relieved from the responsibility and drudgery of its manufacture.

Wherever even a few persons make use of protoxide of nitrogen, the most convenient plan would be to get some one to make and constantly keep on hand the gas—or, in other words, to purchase the gas, as required, of some manufacturer.

If the gas was made in quantity, the saving in the mere item of loss from accident would be amply sufficient to yield a large profit. If made in large quantities, it would also generally be found of a more uniform and better quality.

The gas could be ordered, as wanted, in caoutchouc bags holding from six to sixty gallons, or could be delivered into a reservoir established at some convenient point in or adjoining the operating room.

Certain persons may always prefer to make their own gas; but whenever or wherever a considerable demand for the gas exists, it seems to me that the method I suggest for obtaining it is the most natural, as I believe it would prove the most satisfactory—at least, those who might wish to use the gas would no longer have occasion to complain of the inconvenience and trouble of making it.

Another point to be considered is the bulkiness of the gas. Several surgeons have said to me that they should frequently use the gas but for the necessity of transporting a "balloon." This must, however, always be rather a surgical than a dental objection. The volume of the gas is really a matter of small consequence in an office where operations are of daily occurrence. It is only when it becomes necessary to carry the gas out of the operating room to produce anæsthesia at the residence of the patient that its bulk is felt to be inconvenient.

Although almost the rule in private surgical practice, this necessity can seldom exist either in dental or hospital practice, which will always furnish by far the largest number of the subjects for anæsthetic administrations. Still, the importance of being able to employ gas at the residence of the patient is often such as to make it very desirable to obviate, if possible, a difficulty which threatens to make the anæsthetic employment of protoxide of nitrogen more or less impracticable in a considerable department of surgical practice.

The experiments of Faraday, M. Natterer, Dumas, and others, upon the condensibility of different gases, have a practical bearing upon this subject. Protoxide of nitrogen can be reduced in volume very greatly by pressure; it can even be obtained in a liquid state, under a pressure of 50 atmospheres at a temperature of 45°. These are well known scientific facts. I am ignorant, however, if any very careful investigations have as yet been made as to the possibility of utilizing these facts in the interest of anæsthesia. Mr. Barth, of London, it is true, has charged iron vessels with gas under a pressure of 20 or 30 atmospheres. I believe, however, he has made a mistake—that he has not gone far enough.

A litre vessel, under a pressure of 30 atmospheres, will hold but 30 volumes of gas; under a pressure of 50 atmospheres the gas liquefies, by which change of form, instead of simply obtaining 50 litres of gas, quite 400 may be secured. This is a gain too great to be lost. But another advantage is obtained by liquefying the gas, almost equally considerable. Liquid gas is comparatively *pure*, while compressed gas remains unchanged in its composition. This is not simply a matter of theory, as I have always observed that a given effect could be produced by a quantity of liquid gas representing a volume but little more than half that required when common gas was used.

It is therefore in order to have protoxide of nitrogen in a form as pure, compact, and portable as possible, that I have had it reduced to a liquid by mechanical compression.

It is hardly necessary for me to speak of the physical properties of the fluid thus obtained. It is colorless and exceedingly volatile, boiling under a pressure of one atmosphere at 125°. Touching the skin, it produces the sensation of a molten metal. Quicksilver poured upon it freezes almost instantly; a match still ignited flashes upon its surface into a brilliant flame. When administered, it is drawn off into bags—like those, for example, employed by Mr. Clover, of London—where it resumes its original volume, and from which it is inhaled in the usual way.

The vessel or bottle which I first used to hold the gas, and which I recently exhibited in London, was made of bronze, and, without going into needless details, may be described as quite similar to the one employed by Natterer in his experiments. Although it answered the purpose sufficiently well to illustrate the practicability of using the liquid gas, it is not precisely what is wanted for the special object in view. Protoxide of nitrogen is a gas so subtle and evasive under pressure as to require an apparatus with still more perfect joints. Natterer's machine also is much larger than is necessary. A bottle with a capacity of a pint would hold about fifty gallons of *pure* gas—a quantity abundantly sufficient for any surgical operation. The bottle also should combine sufficient strength with lightness and simplicity of construction.

I do not wish to overlook or underestimate any of the practical difficulties which must be overcome by whoever may finally succeed in giving the gas to the public in the liquid state. I believe, however, these difficulties will be overcome so soon as the laws and properties of the gas are studied in their relations rather to practical than theoretical science. To-day I have only time to refer especially to one, which, however, is the most important, as it is also the most obvious difficulty.

Before dentists and surgeons will use liquid protoxide of nitrogen, they must first be assured of its safety. The idea of holding in the hand, or carrying in the pocket, a bottle within which there is an active bursting force of 750 pounds to the square inch, is certainly scarcely comforting to a naturally timid man. But a consideration of the facts which bear upon this point will, I think, remove all apprehension, and cause every one to feel that there can be little if any danger when the gas is confined in properly constructed bottles.

A common *glass eau de seltz* bottle is charged under a pressure of about 100 pounds to the square inch. These bottles are not generally considered as dangerous, yet they are more likely to burst than a bronze bottle of similar form and thickness, under ten times that pressure. A fowling-piece, when discharged, is subjected to a bursting force of about 15,000 pounds per square inch, or *twenty* times the explosive force of the liquid gas.

These two very familiar facts are sufficient to show that there is relatively little danger to be apprehended from the gas. To remove, however, all possibility of accident, the bottles, after having been charged, should be placed in a bath of boiling water. The expansive force of the gas will be immediately enormously increased. If they resist this test, after such a proof of solidity and strength, the bottles may regarded as *absolutely* safe.

It remains for me to allude to a special application of liquid protoxide of nitrogen. I refer to its use as a local anæsthetic. When the liquid is let out of the discharging orifice, it evaporates so readily as to be capable of producing some of the lowest degrees of cold known to science, and local anæsthesia by refrigeration can be obtained with greater rapidity and certainty than by any method with which I am acquainted. The degree of cold produced can be readily controlled by a properly constructed escape pipe or orifice. A sufficient number of experiments have been made to demonstrate the power and effectiveness of the gas when employed in this way. I have not, however, as yet studied this application of the gas comparatively. Indeed, I have never been a very earnest advocate of local anæsthesia, especially since protoxide of nitrogen has fairly taken its place among general anæsthetics; but if ever it may be advisable, as doubtless it may be, to employ such a means of producing insensibility, it seems to me that liquid protoxide

of nitrogen can be employed with very marked advantages, not the least of which is that the operator making use of the gas in this form has it always in his power to produce local anæsthesia without the employment of a special apparatus.

I have prepared these notes somewhat hastily; still I believe they may be found of practical value, or at least be of interest, to those who have occupied themselves recently with protoxide of nitrogen and its employment as an anæsthetic.

PROCEEDINGS OF DENTAL SOCIETIES.

AMERICAN DENTAL ASSOCIATION.

BY W. C. HORNE, D.D.S., OF NEW YORK.

THE eighth annual meeting of the AMERICAN DENTAL ASSOCIATION was held at Niagara Falls, commencing on Tuesday, July 28, 1868. There was an attendance of 143 members, representing about thirty-eight local societies and eight dental colleges.

The meeting was called to order by the President, Dr. A. Lawrence, of Lowell, Mass., and the Committee of Arrangements made a report of the members present as delegates from local societies. Objection being taken to the reception of delegates from the American Dental Convention, by Dr. W. C. Horne, their credentials were referred to a committee of five, to report whether the Convention was entitled to representation in the American Dental Association.

The usual committee of nine, to nominate officers and standing committees for the ensuing year, on motion of Dr. L. D. Shepard, was chosen by open nominations, and *viva voce* elections. It was as follows:

Drs. H. F. Bishop, W. W. Allport, W. F. Morrill, A. L. Northrup, J. H. McKellops, J. H. McQuillen, L. D. Shepard, W. P. Horton, G. T. Moffatt.

An adjournment was then had.

FIRST DAY.—*Afternoon Session.*

The Association reassembled at 4 P.M. The minutes of last year's session were read and approved. The committee to whom was referred the credentials of the delegates from the Dental Convention reported, that in their opinion the Convention was not entitled to representation, as it was not in any proper sense a local society, and required no qualification for membership, other than a fee of one dollar from any person taking part in its proceedings; that membership in the Convention expired at its adjournment, the officers holding over for the convenience of future meetings. The committee further stated that there was no ground for any personal feeling, in case of the rejection of this delega-

tion, as two of the delegates present had appointments from recognized local societies, while the third was a member of a society entitled to several more delegates than were present, for some one of whom he could appear as a substitute.

This report was signed by Drs. W. C. Horne, B. F. Spellman, E. G. Cummings, A. B. Robbins. A minority report was presented by Dr. W. H. Morgan, which recommended that the delegates be admitted. An excited discussion ensued, which occupied the greater part of the afternoon session, during which the report of the majority was stigmatized by one of the opponents as a shameless and shameful production, and the motives of those preparing it attributed to personal objections. The minority report was finally adopted by a vote of 51 to 56, admitting the delegates to seats.

The Nominating Committee reported the names of candidates for the offices of the Association; which was followed by an election, with the following result:

President—Jonathan Taft, Cincinnati.

Vice-President—Homer Judd, St. Louis.

Corresponding Secretary—James McManus, Hartford.

Recording Secretary—Edgar Park, St. Louis.

Treasurer—W. H. Goddard, Louisville.

Dr. Taft received the compliment of a unanimous ballot.

The Association then adjourned.

SECOND DAY.—*Morning Session.*

On Wednesday morning, after the reading of the minutes, the first business was the induction of the officers elect. Dr. Taft having taken the chair, the retiring President, Dr. A. Lawrence, of Lowell, made an address, according to custom, in which he reviewed the history of the Association. He said that American dentistry had risen from a humble origin, and become a highly respectable power for good in the country; once "weighed in the balances, and found wanting," it has now grown corpulent and symmetrical, and can speak, act, and manfully justify itself. It had come to be thought an indispensable profession, for no man or woman could be a "glorification of God," without beautiful teeth and a healthy digestion, to which these so greatly contribute. Dwelling upon the advantages of a national association to maintain a standard of ethics and practice, he next proceeded to mark out the indispensable qualifications of an accomplished dentist. The operators who scatter untruthful advertisements through the country, he said, sustained about the same relation to the true dentist as did the barbers of the olden time when they added to their vocation that of tooth-drawing and phlebotomy. He hoped to see science and skill remove all quackery and bungling operators, and bring out, instead, all the

capabilities of the profession. He recounted the organizations of dental societies claiming to be national, of which the first was the American Society of Dental Surgeons, which was followed by the American Dental Convention, still in existence, of which the President expressed his trust that it had done some good. The American Dental Association was organized in 1859, at Niagara Falls, with twenty-six members, the constitution being modeled upon that of the American Medical Association. It next met in Washington, at the Smithsonian Institute. In 1861, owing to the condition of the country, there was no meeting. In 1862 it sat at Cleveland. In 1863, at Philadelphia, the membership was largely increased, and the Association proved to have passed through its experimental days, and reached the position of being the acknowledged representative of the dental profession. Its vigorous branches now overspread the land, in local societies in almost all parts of the nation. Reference was made to recent laws enacted by the Legislatures of New York and Ohio, with intent to confine the practice of dentistry to regularly qualified persons, which were commended for general imitation. He concluded by encouraging the members to greater efforts for the advancement of dental science and art.

The Treasurer's report was then read, showing the receipts during the past year to have been $979, and the expenses $884, leaving a balance on hand of near $100 at the commencement of the session. Certain suggestions, in the Treasurer's report, in regard to permanent members who had not paid their dues for meetings of the Association which they had not attended, and concerning the distribution of the Transactions, were referred to a special committee.

The order of business was suspended to hear from Dr. A. Westcott, of Syracuse, a description of the means used in regulating an upper and under set of teeth, of which plaster casts were presented. He said the first effort to move a tooth should be very slight, for then more could be done at the second effort with less pain. Neither springs nor elastic substances should be used if it were possible to avoid it; and to the almost exclusive use of wooden wedges, in the present case, did he attribute the absence of inflammation, notwithstanding the great extent of the movements attained. He preferred that no plate should be used in the mouth; but where that was unavoidable, it should be dispensed with at the earliest possible moment. He made it a rule to obtain the lateral movement first, and finish that, before beginning the longitudinal movements. Where the teeth are so short as to make it difficult to get hold of them, he drills into them and inserts a gold screw or staple by which to make attachments. Any ill effects of any regulating apparatus, upon the substance of the teeth, might be obviated by removing the plate and cleaning it after each meal, cleansing the teeth and rinsing the mouth with soda water. The speaker exhibited all the apparatus

used in this case, which was very elaborate and ingenious, but which could only be described at great length and by the aid of engravings. The process of regulating was a very tedious one, occupying several months; but the result was the perfect arrangement of what had been an extensive malposition of the teeth of the upper and under jaws.

Dr. A. Whitney, of Buffalo, presented a resolution instructing the Committee of Arrangements to admit certain dentists as delegates from local societies in Canada. The point of order being raised that the use of the qualifying words "in the Union," and "in the United States," in the constitution, precluded the admission of delegates from foreign countries, the chair decided the point not well taken. On an appeal, the house reversed the decision of the chair. The gentlemen were not admitted as delegates, but under another resolution they were invited to the privileges of the floor as guests of the Association. Dr. Scott, one of the gentlemen referred to, in answer to inquiry, stated that American dentists could practice in Canada, as assistants of Canadian dentists; or in their own right, after a residence of two years, and upon taking the oath of allegiance.

On motion of Dr. McQuillen, a committee of three was appointed to examine the report of the Committee of Arrangements, and ascertain whether those presenting credentials were all practicing dentists, and if there had been any informalities with respect to the reception of delegates. Drs. McQuillen, Horne, and Allport were appointed by the chair.

An adjournment was then had.

SECOND DAY.—*Afternoon Session.*

At four o'clock the Association was again called to order by the President.

A resolution was offered by Dr. J. A. Perkins, of Albany, reciting that Dr. C. P. Fitch, of New York, had violated the Code of Ethics, and moving that his name be stricken from the roll of membership. It was referred to the Committee on Dental Ethics.

The Auditing Committee on the Treasurer's accounts reported the same correct, and recommended a vote of thanks to that officer; all of which was adopted.

A motion to appoint the next place of meeting prevailed, and after a number of nominations, and two or three ballots, Saratoga Springs was decided upon.

The committee appointed at the morning session to examine into informalities in the credentials of members, reported that they found one member present, as a delegate, who is not in the practice of dentistry, and others, as permanent members, who have retired from practice and engaged in other occupations, and who, therefore, according to the con-

stitution, are not entitled to membership. That, after a careful, calm, and dispassionate consideration of the claims of the delegates from the Dental Convention, they were of the opinion that the Convention is not entitled to representation in the Association, and recommended a reconsideration of the vote of yesterday adopting the minority report. They further offered for adoption the following form of certificate, to be required of all delegates presenting themselves in future:

This certifies that ——— was duly appointed a delegate to the American Dental Association, from the Dental Society of ———, on the ——— day of ———, 18—, and that the said ——— is a dentist of good character and standing, and at this time in regular practice.

Signed, ——— ———

Secretary of the Dental Society of ———.

The report was discussed for more than an hour, giving rise to as much excitement as that of the previous day, in the course of which an attempt to impute improper motives to the committee by one of the speakers was checked with the most marked demonstration of disapprobation on the part of the Association. It was voted upon in sections, but, apparently through dislike to negative previous action, the certificate for future members only was adopted, and ordered to be entered in full upon the minutes, and the Secretary directed to publish the same in all the dental journals.

A motion was then made for a committee to revise the Constitution and By-Laws, which was carried; and the chair appointed Drs. Bogue, Morgan, and Goddard. The Association then adjourned.

Third Day.

On Thursday morning the first business after the reading of the minutes was the presentation by Dr. Kingsley, of New York, of improved appliances to remedy defects, congenital or acquired, in the hard or soft palate.

Dr. Kingsley stated that two years ago, at the meeting at Boston, he had given the result of his experience in full up to that time, but that since then he had made such advances in simplifying his appliances as to render success easy to any dentist of moderate skill. He desired his hearers to keep clearly in mind the distinction between congenital and accidental deformities. Patients suffering from the former require months, and sometimes years, to overcome the difficulties of articulation, even with the best-fitted appliance; while in accidental lesions, not only is the appliance much more simple in its character, but the results are attained immediately on its introduction. He was very particular that this discrimination should be made, in reading the reports of cases published from time to time, as it was not unfrequently the case that great claims were put forward, for so-called improvements, when a closer scrutiny or inquiry would reveal that it was a case of ac-

cidental deformity, and the results attained were no indication whatever of what would be done in congenital defects. He instanced the case of a patient, a man nearly fifty years of age, for whom he had made an artificial palate within the last month, where the natural soft palate was entirely gone, and whose speech could not possibly be understood by any stranger; and yet, immediately on the introduction of the new palate, his speech was entirely restored. This defect was the result of disease, and although it had occurred nearly thirty years before, and during all that time his power of articulation was gone, his restoration, on the application of the palate, was complete. If the deformity had been congenital, although it might have been precisely the same in locality and extent, pure articulation, at that age, would probably never have followed.

He presented an impression in plaster which embraced the teeth, hard and soft palates, together with the nasal cavity and the chamber of the pharynx, and briefly described the method of manipulating, which was substantially the same as that published in the previous reports of the Association. His improvements, within the last two years, were in the form of the palate, and the mould in which it was made.

The mould, while still of type metal, is so simplified that instead of being, as formerly, in four pieces, it is now made in a flask of two pieces, with a brief outlay of time and skill. By placing a ring, of the same size, between the halves of the flask, thus separating the type-metal dies, and filling the space with a more fusible alloy, the mould is doubled, and the process can be repeated indefinitely, where a number of similar instruments may be required—the palate produced from such a mould being the same in form and utility as that made from the mould of four pieces.

Another improvement was a light framework of gold, provided with a joint, the frame to support rubber flaps or wings for an artificial palate, and the joint to permit the perpendicular movement necessary to correspond with a similar movement of the natural palate. This method of making an artificial palate is such that the same frame and rubber wings can be applied to nearly all cases of fissure which do not extend beyond the soft palate, and, in an emergency, the rubber wings need not be made expressly for it, but may be cut out of the sheet rubber of the market. He exhibited his instruments, and also his moulds, describing the various processes of manipulating; but a more detailed description than the foregoing would necessitate engravings for its comprehension. A unanimous vote of thanks was passed by the Association.

The reports of the standing committees being now called, the first in order was that on Dental Pathology and Surgery, which was presented by Dr. Atkinson, of New York.

Dr. Bogue, of New York, from the same committee, read a paper re-

capitulating the points which, in this department, had attracted special attention during the year. The question of the contents of the dentinal tubuli; of the efforts of the dental pulp to protect itself from the approach of decay by the consolidation of the intervening dentinal tissue; and the results of recent efforts for the preservation of the exposed pulps of decayed teeth, with other points of less importance, were commented on and afforded texts for discussion. Admitting that only a careful record of a large number of cases can be relied on to prove any theory correct, he inferred, though he could not consider it proven, that the pulp is as capable of reparative processes as other vascular structures. Salivary calculus was treated as a direct source of injury, and its perfect removal necessary, to be followed by an application of escharotics to induce renewed action of the peridental membrane. The treatment of epulis was touched upon. An apparent extirpation was not deemed to be sufficient, but a removal of the surrounding healthy tissue was demanded, to be followed by thorough cauterization.

Dr. J. S. Dodge, Jr., of New York, referred to certain dark-colored nodules found upon the roots of teeth, and even upon their extreme ends. He could not agree with the common opinion which considered these to be deposits of a calcareous nature from the saliva; there was no practical limit to the deposit of tartar upon the exposed portions of the tooth, but it was confined to the border of the gums, and was of a light color. Black nodular deposits were never found but on the roots of teeth, under the soft parts, and never in large masses, and their tendency was to work to the apex of the fang. Some other source must be found for them than that of deposit from the saliva. He had tried to make microscopical sections of them, which, from their size and formation, was difficult, but in two instances he had partially succeeded. The whole mass was composed of very regular concentric layers of accumulations, in aggregated spheres, not similar to any organic forms in the body. So much had been seen: his conclusion was, that these nodular masses were deposits of calcareous matter similar to those thrown out by the periosteum for the formation of bone, but being in a diseased condition, the process was merely carried so far as to form aggregations on the surface.

Dr. Atkinson had never seen such a deposit, except where it had advanced, as tartar does, on the recession of the gums; and even where the gum and peridontium were disconnected from the tooth to such a degree as to loosen it, he would not despair of restoring the original attachment. His process was to thoroughly remove every portion of the deposit, whatever its character, not being at all fearful of cutting into the substance of the cementum, wash clean, and inject once thoroughly, with a hypodermic syringe, a solution of chloride of zinc. This treatment he would pursue, not merely for nodular deposits, but also for

rings below the margin of the gums. He remarked that it was questionable whether hard tissues once fully formed undergo any change.

Dr. C. R. Butler, of Cleveland, Ohio, inquired how Dr. A. got at the end of the root for deposits at that point.

Dr. Atkinson replied that he followed up the open channel, whether by the side of the tooth or a fistulous opening through the alveolus, and rasped off the end of the root, never disturbing the connection between the soft parts and the tooth, at its neck, when that was intact.

Dr. Butler had never seen the accumulations spoken of on roots where the periosteum was intact, but found it common on the parts denuded. When he deemed amputation admissible he would have no fear of disturbing the alveolus, unless the condition of the patient forbade any operation whatever, but would clip off the apex of the root in whatever manner was most convenient.

Dr. Bogue alluded to cases coming under his observation directly from other practitioners, who pronounced the teeth free from tartar; yet the teeth would be lost if left as they were. The only indication in these instances was a redness of the margins of the gums, and he found always that the alveolus was absorbed and the periosteum detached. He had never practiced the amputation of the end of the root, but had succeeded in removing the nodules after repeated effort, and then made mildly escharotic applications.

Dr. C. Palmer, of Warren, Ohio, had never found any depositions on the roots, except where there had been external openings, and believed the one was necessary to the other.

Dr. W. H. Morgan, of Nashville, was not prepared to concede that these deposits were tartar; their nature was still a question in his mind. He recalled a case in which there was a considerable deposit of a calcareous nature on the root of a tooth, with no external opening, in the vicinity of which there had been a tumor.

Dr. H. Judd, of St. Louis, said it must be conceded that the origin of these masses is either from inflammatory action or by deposit from the saliva. In the latter case there must be external communication, and in recalling instances to mind they supported this hypothesis. Carbonate of lime, when mixed with fatty substances, forms in globular masses.

Dr. Allport, of Chicago, in looking back, could not remember having seen a case of black deposit on the root, where the gum and alveolus were intact at the neck of the tooth. Other globules, of much lighter color, found under the soft parts, without an external opening, were doubtless the results of diseased action, as suggested by Dr. Dodge. There being no means of escape for the secretion under these conditions, it aggregates upon the surface of the root.

Dr. McClelland, of Louisville, Kentucky, was of the opinion that

deposits from the saliva would be found where that secretion was most abundant; its being found under the gum was conclusive evidence to him that it was thrown out by the peridental membrane.

Dr. McQuillen agreed with the opinion that tartar could not be deposited without an external opening. Referring to the intimation of a doubt whether the hard tissues could undergo change, he said that there was no tissue in the animal or vegetable kingdom, with the possible exception of the enamel, which does not undergo continual change. Have not the investigations and experiments of Hunter, Duhamel, and others proved this most conclusively? What are our senses worth, if we do not use them to observe the phenomena everywhere presented. Time could be more profitably spent in observing, recording, and generalizing facts than in getting up fanciful theories, expressed in language incomprehensible to ordinary minds. Dr. Lionel S. Beale was the first to take exception to the general view relative to changes in hard tissues, and the speaker combated his statement several years ago. He cited, in proof of constant change, the formation of the frontal, sphenoidal, and maxillary sinuses, the diploe in the flat bones, and medullary canals in the long bones, and the process by which the deciduous teeth, after being built up cell by cell, at the proper time, by a retrograde metamorphosis, are absorbed cell by cell. In the permanent teeth the evidences of change were constantly occurring—as in hypertrophy of the cementum, and the not infrequent absorption of the cementum and dentine in other cases. Permanent teeth extremely soft in early life become almost as hard as flint at a more advanced age. Again, teeth which had been quite dense and perfect in their structure, as in the case of females, after the commencement of the maternal functions lose much of their former hardness, owing to the waste constantly going on not being supplied by a sufficient amount of material to meet the demands of mother and child; in which case the latter is nourished at the expense of the former, and the mother's bones and teeth become softened. He drew attention to these facts mainly to induce greater efforts for the preservation of the teeth of young persons, as operations, the success of which might almost be despaired of, would frequently prove of lasting benefit, owing to an improvement in the texture of the dental organs.

Dr. John Allen, of New York, urged the necessity of providing in the food materials which should supply, atom by atom, the wants of the system. He asserted that, as a nation, Americans have the worst teeth of any people, because they change the proper proportions of the constituents of the food; while in countries where this is not done, the people retain their teeth, sound and beautiful, to old age. To show the gigantic scale on which we do this, he said that from every barrel of superfine flour, 40 pounds of mineral matter were rejected in the process of manufacture; and, allowing half a barrel of flour as the yearly allowance of a child, every child is deprived of 20 pounds per annum of the material most necessary

for perfecting the osseous structure of the body, making an aggregate loss to the system, in twenty years, of 400 pounds. To accomplish this great waste, 28,000 men are employed, at an outlay of $9,000,000, and a destruction of 20,000,000 pounds of the material essential to the formation of sound teeth and bones. To offset this evil, 10,000 dentists are employed by the American people, but their efforts are entirely inadequate to compete with the destructive agencies above named. When the conclusion is accepted that proper diet is the highroad to improvement in the quality of the teeth, he would have hopes of a stronger and healthier organism; but any means short of a radical change in this respect would prove inadequate.

Dr. Atkinson said the whole philosophy of filling teeth depended on the assumption of the durability of their structure. He delights in putting things into the teeth that irritate them. Without irritation there could be no nourishment; the similarity or dissimilarity of the irritation, produced by remedies or food, to that required by the organism determined the ascendency of health or disease. The rule had been that when the pulp of a tooth became exposed it should be devitalized and removed, and the root filled to its end. He asserted that a man was weak or wicked who would willfully destroy a tooth-pulp; all that was necessary was to use an agent which would coagulate the albuminous surface of the exposed pulp, and the subsequent operations were certain to be successful. His practice was to cover the exposed pulp with creasote, upon which he dropped the oxychloride of zinc in a plastic condition; when this had hardened, he proceeded to remove the excess of the material and fill the cavity as usual with gold. If the inflammation had gone on to suppuration, he would fill temporarily. Suppuration is the production of pus, and pus is a fluid composed of serum and white corpuscles deprived of their vitality. All the tissues of the body are made up of corpuscles, the white forming the nerve tissues; the red, the muscles. Cohnheim had seen the corpuscles pass through the walls of the capillaries.

Dr. B. T. Spellman, of Warren, Ohio, said that he did not understand the white corpuscles to be a component of pus, but that their character was changed by diseased contact. He had heard, from many witnesses, that the treatment of exposed pulps just detailed was in their experience productive of much pain, and therefore he considered it bad practice.

Dr. McQuillen said pus was regarded, by the best authority in surgery, as a fluid, composed of dead exudation corpuscles floating in serum, these exudation cells, in their normal condition, being the tissue builders. It was impossible that white corpuscles could pass through the walls of vessels to be incorporated in the structure of nerve tissues. He had been accustomed for years to demonstrate to his students the circulation of the blood in the frog's foot, tongue, lungs, and in the mesentery, and had watched the process by hours, and had yet to see the phenom

enon referred to. Admitting Cohnheim's observations to be correct (which he was not disposed to do), the propriety of drawing deductions from pathology to sustain physiological theories was a very defective and illogical method of reasoning. The number of persons who had seen ultimate nerve fibres was exceedingly limited. Only those who had employed the higher magnifying powers could lay claim to this distinction. The corpuscles rolling through the capillaries might appear to pass through the sides of the vessels, but it was only an ocular deception. The caliber of an ultimate nerve fibre was infinitesimally smaller than that of a white corpuscle, and, in addition, it was made up of three distinct structures, the neurilemma, the white substance of Schwann, and the axis cylinder. How, then, can a corpuscle make up such a nerve fibre? The same objections held good with respect to muscles being formed from the red corpuscles. The ultimate muscular fibrillæ (which consists of the myolemma, a membranous sheath inclosing the sarcous elements) is much more minute than the red particles of the blood. Many years ago similar views to those presented here were advanced by Doellenger and Dutrochet, and their fallacy was then exposed. The perfection at which microscopy has arrived, and the use of good instruments, enable us, by comparing with precision the size of different parts, to completely refute this untenable theory.

Dr. Wetherbee, of Boston, stated that, two years ago, when he spoke of the use of the oxychloride for capping pulps, Dr. Atkinson expressed his doubt of its adaptability. He gave his experience in a number of cases where he had succeeded in its use. Frequently there was pain for a short time, but without subsequent uneasiness. He does not consider the pain dangerous, or the material in any manner endangering to the pulp; it acts as an astringent. Two cases in which the pulps bled, two years ago, now have all the indications of living structures.

Dr. J. S. Dodge, Jr., said, if the effort to preserve exposed pulps were any new thing that had not been tried heretofore, he would go home to try it with a good deal of zeal. But this was not the case; it had been a favorite practice years ago with the old practitioners, and when he commenced his practice he was somewhat enthusiastic about it, though even then the old men had begun to shake their heads about it, and since that they had been shaking them harder and harder, until the operation of filling over exposed dental pulps had gone out of date. Now a new material was coming into fashion, it appeared, for the same purpose, the oxychloride of zinc. Put this in a sensitive tooth, and it would cause severe pain, and its effects upon an exposed pulp, he believed, would be ultimately to destroy it.

Dr. Allport said that exactly what proportion of exposed pulps could be preserved by any method could only be stated after the comparison of a large number of recorded cases. After the explosion of the theories of Harris, those who enunciated any method of saving

pulps were looked at with a quizzical glance. He then referred to the operation which he had introduced, consisting of an excision of a portion of the exposed pulp, which was relieved of congestion by the consequent bleeding, leaving flaps to come together and heal by first intention—admittedly a very difficult operation—and claimed that he had by that method saved a large number of teeth, and obtained a new calcareous deposit at the point of exposure.

The treatment prescribed by Dr. Harris gave the pulp the best possible chance to inflame and suppurate, by leaving a space between it and the cap. He would have gentlemen not deny what they had not tried; he had not used the oxychloride, and knew nothing about it, but half believed what had been said about it to be true. He believed there was something living in the pulp. Kōlliker, years since, said the dentinal tube or canal was an elongation of the dentinal cell resting on the pulp. In a recent work he reiterates this, and says this is the channel through which the calcareous mass is deposited, and this would account for the increased density of portions of dentine near points of decay.

Dr. Wetherbee, in answer to a question, qualified his previous statements as referring to pulps simply exposed, not inflamed. He said that no large amount of oxychloride should be allowed to remain in the tooth longer than a few weeks, as the free acid in the preparation would act most injuriously upon the substance of the tooth.

Dr. A. W. Freeman said he had obtained as good results as that with Hill's stopping.

Dr. Kennicott, of Chicago, thought misunderstanding arose from some attributing a medicinal virtue to the material under consideration, whereas he considered any good resulting from its use to be due to mechanical causes. No sensible man would proceed to fill permanently over an exposed pulp until he was sure that it was in a healthy condition; every application previous to that should be considered preliminary treatment. The oxychloride was a substance which, applied in a plastic condition, adapted itself without pressure to the exposed vascular pulp, and then, on hardening, protected it for a time from the action of external agents.

Dr. Horne, of New York, said that he had waited up to this time in the expectation that the various advocates of the new plan, if let alone long enough, would destroy one another's arguments, and his expectations had been fulfilled. The use of the oxychloride of zinc had been first brought to general notice at the meeting, two years ago, at Boston, where Dr. Keep, of that city, claimed large success in a number of recorded cases. It was a question in his mind if the material which Dr. Keep used was at all like the material sold under that name in the dental depots; and the gentlemen who had thus far spoken used the oxychloride of the shops, and not Dr. Keep's preparation, as far as he could judge. The whole claim really amounted to about this:

aration, called oxychloride of zinc, consisting of a white powder, which is mixed into a mortar with an acid fluid, is plastered into the tooth over an exposed pulp; the patient has more or less pain for a longer or shorter time, and then it stops; after hardening, cut away the surplus material and fill the cavity with gold, and, where there is no subsequent pain, conclude that the pulp of the tooth is alive and all going well. Some modify this process by covering the exposed pulp with creasote before putting in the mortar, and claim that there is then no pain felt. A great many who had tried the same process had had a great deal of subsequent pain to contend with. But all this superstructure had been built upon the slight foundation of some temporary apparent success, opposed by a great deal, perhaps more, of evident failure, in the face of the well-known fact that teeth containing dead pulps might lie dormant for years and then break out into the most troublesome activity; and also that pulps, after having been exposed, might, on the condition of exclusion of air and moisture, quietly die and become atrophied. On the other hand, it was as certainly true that an exposed pulp was occasionally found which, having maintained its healthy vitality, and being protected from external irritation, threw out from its enveloping membrane a deposit of secondary dentine, which more or less perfectly shut up the opening into the pulp cavity. But these cases were so rare that men would go from one city to another to see them. Admitting all the favorable cases cited to-day as perfectly true, so far they were utterly insufficient to prove that the pulps in question were not now dead, or undergoing a slow destruction by the free acid whose presence had been so incautiously alluded to, or by the powerful escharotic (creasote) used to abate the pain caused by the acid, and whose legitimate action would be to destroy the soft tissue with which it came in contact, insuring to it only a less painful death. While experimentation was to be sedulously encouraged, he deprecated the confident assertion, as fact, of what was only supposition. Let us see what a few years may bring forth. Other theories, as well supported as the one here presented, had needed but a short time to run themselves out; and he was therefore the more careful not to fall at once into every new current, but rather disposed to prove all things.

Dr. Hitchcock, of Boston, was glad that oxychloride had now so many friends; two years ago, in Boston, it could hardly get a hearing. He referred to a number of cases that he had reported to the Massachusetts Dental Society during 1866–7, and published in the dental journals. A majority of all these cases he had seen since, and on examination by means of cold applications, found the pulps alive. The material for sale in the dental depots was not the same as that used by Dr. Keep and by himself; on the contrary, it contained a great deal of impure and sometimes deleterious matter; he had found that of a yellowish color better than the pure white.

Dr. J. S. Knapp, of New Orleans, contributed a paper on "Hidden Dental Caries," intended to induce a close examination of the teeth before dental operations are begun, in order to preclude the oversight of decay in positions where it is least likely to be observed, as on the approximal surfaces of bicuspids and molars.

At the evening session the Committee on Dental Physiology was called, but made no report.

The Committee on Dental Chemistry responded, in a paper by Dr. H. S. Chase, of St. Louis, on the "Character and Uses of the Saliva." It stated the characteristics of this fluid, with directions how to obtain it for testing its reactions; quoted various estimates of the quantity of this secretion, and its chemical composition; gave the results of a number of the author's experiments on different animals, in which he found the saliva to be acid; and concluded that healthy saliva is not neutral in its reaction in man or in the lower animals, and that nature makes a strong effort to place the saliva in a physiological condition at the time food is being masticated. The offices of the saliva were next noticed, and some general considerations adduced as to the organic matter found in it.

Dr. Atkinson remarked that it was too much to suppose that a mere tyro should be able to experiment more successfully than men who had devoted their whole lives to similar investigations, under the direction of men who in turn had devoted their lives thereto, with all the advantages of governmental patronage. While he did not consider slavery to authority a credit to any teacher, he should like to have the man who wrote this paper on the stand and prick him closely; to learn how these experiments were performed, and all about it.

Dr. Wetherbee thought the author must have considerable erudition to make the tests mentioned, and believed there was enough in the report to entitle it to a favorable reception.

Dr. Judd was well aware that a great variety of experiments were necessary to establish any one point—but even a few experiments were better than none; he had no doubt that the observations were all made as reported, and carefully made. He had made a few experiments in various directions, and would give more for the light he had gained from them than from all he had gained by discussion. He disclaimed any intention of backing up this paper or any other.

Dr. Buckingham, of Philadelphia, regarded the paper as an able one; no fluid of the body, he said, is more difficult to test than the saliva, the changes taking place in a moment's time. He hoped the effect of the essay would be to set members to thinking and experimenting.

The reports, so far as read, were all referred to the Publishing Committee, and the Association adjourned.

FOURTH DAY.—*Morning Session.*

On Friday morning, after reading the minutes of the previous day, a resolution was adopted recommending members of the dental profession to procure the passage of laws regulating the practice of dentistry in all States where no such laws exist.

A resolution, offered by Dr. I. J. Wetherbee, to pay Dr. Abell $100, for furnishing each member of the Association with a copy of a paper to be published by him, containing a report of this meeting of the Association, with the President's address, was laid on the table until after the report of the Publishing Committee should be presented. The amount was subsequently cut down to $20, and the resolution passed.

The committee appointed to consider suggestions of the Treasurer reported a resolution in regard to the distribution of the Transactions of 1865 and 1866 bound in one volume, that those who were members at Boston and not at Chicago should pay one dollar extra for the first half of the book to which they are not entitled. They also reported the following resolution, "That no member shall be hereafter eligible to hold office or vote, or take any part in the proceedings or business, until his dues are paid." Both were adopted.

A resolution that the Treasurer be henceforth paid $50 per annum, for collecting the fees of members and taking care of the accounts, and voting the same amount to the Secretary, on condition that he prepare the Transactions for delivery to the Publishing Committee, was also adopted.

The report of the Publishing Committee of 1866 was presented by the chairman, Dr. Shepard. The total cost of the volume of 512 pages, embracing the reports of two years, 1865 and 1866, brought out by them, is $1110, for an edition of 500 copies; $600 of the amount had been paid, leaving a balance of $500 due the publisher. After the distribution of the copies to all the members of the Association entitled to them, there will be between two and three hundred copies left.

The report was accepted with the thanks of the Association. The Treasurer was instructed to pay the balance of $500 due. On the recommendation of the committee, a number of copies were donated to various learned societies, dental colleges, and dental and medical magazines, in this country and Europe. The further distribution to members and authorized sale of surplus copies at $5 each, was left in the hands of the committee.

The Committee on Nominations made the following report, which was adopted without change:

STANDING COMMITTEES FOR 1868–69.

Committee of Arrangements.—J. G. Ambler, New York; L. W. Rogers, Utica; L. S. Straw, Newburg.

Committee on Dental Pathology and Surgery.—J. S. Latimer, New York; M. DeCamp, Mansfield, Ohio; G. T. Moffatt, Boston; A. B. Robbins, Meadville, Pa.

Committee on Dental Physiology.—W. H. Morgan, Nashville; A. Westcott, Syracuse; H. S. Chase, St. Louis.

Committee on Dental Chemistry.—T. L. Buckingham, Philadelphia; H. A. Smith, Cincinnati; A. Lawrence, Lowell.

Committee on Dental Education.—J. Taft, Cincinnati; F. J. I. Gorgas, Baltimore; M. S. Dean, Chicago.

Committee on Dental Literature.—R. W. Browne, New London; L. D. Shepard, Boston; J. McManus, Hartford.

Committee on Dental Histology.—J. H. McQuillen, Philadelphia; W. W. Allport, Chicago; J. S. Dodge, Jr., New York.

Committee on Operative Dentistry.—C. R. Butler, Cleveland; J. S. Knapp, New Orleans; W. H. Allen, New York.

Committee on Mechanical Dentistry.—John Allen and N. W. Kingsley, New York; C. H. Harroun, Toledo; J. A. McClelland, Louisville; S. B. Palmer, Syracuse.

Committee on Prize Essays.—G. H. Cushing, Chicago; A. L. Northrup, New York; W. F. Morrill, New Albany, Ind.; C. E. Francis, New York; F. N. Seabury, Providence.

Committee on Voluntary Essays.—M. S. Dean, Chicago; A. M. Moore, Lafayette, Ind.; W. P. Horton, Cleveland.

Committee on Dental Therapeutics.—E. A. Bogue and A. P. Merrill, New York; I. J. Wetherbee, Boston.

Committee on Publication.—Homer Judd, Edgar Park, E. Morrison, all of St. Louis.

Committee on Instruments and Appliances.—W. C. Horne, New York; Corydon Palmer, Xenia, Ohio; J. A. Bishop, New York.

The report of the Committee on Dental Education was now called for, and presented by Dr. Homer Judd, of St. Louis. He said the subject was divisible into two parts—the first having reference particularly to the acquisition of a practical knowledge of the details of dentistry, while the other referred more particularly to that course of mental culture which marks the dividing line between the tradesman or mechanic and the professional man. The dental journals should not proceed, in their educational efforts, upon the idea that their duties consist entirely in disseminating theories and chronicling new facts; but they should keep in mind that the great want is a general dissemination of *known* facts—dental text-books, like others, being generally far behind the times when they come into the hands of the profession, and not as generally read as the journals. The standing of the profession does not depend, to any great extent, upon the amount of knowledge of dentistry which its members may possess, but its position among the liberal professions is determined rather by the culture and literary acquirements of its members. He thought no one could maintain his position as a man of learning and science who did not daily apply himself to the studies and investigations necessary thereto. While apprecia—

efforts of our dental collegiate institutions in the cause of education, he declared his conviction that the future status of the profession would depend more upon what they shall demand as prerequisites to admission to their classes, than upon the curriculum of study there pursued. Judging the progress of dental education by the number of students the past year, the conclusion would not be flattering; but, to offset this, a higher standard had been required, and the decrease in numbers might be attributed to general pecuniary embarrassment rather than to any dissatisfaction with the course pursued by the colleges. He then remarked upon the value of diplomas as dependent upon the character of the institution from which they issued, and commended the passage of a law in Ohio, requiring the possession of a diploma as a necessary qualification to practice dentistry legally. He encouraged a wider range of education for dentists, in order that their sphere of usefulness might be enlarged, and they be placed on a level with recognized medical specialists.

The report was followed by a paper of a very general nature from S. J. Cobb, of Nashville, Tenn.

The report on Dental Literature was made by Dr. M. S. Dean, of Chicago. No new work, except that of Dr. Arthur on "Decay of the Teeth" had been added to our dental literature during the year. The views presented in this volume were regarded as peculiar and antiquated. The author's views, in favor of "separating all the teeth back of the eye teeth, if the incisors are decayed before the twelfth year," or even, "if there is a reasonable certainty that the back teeth will decay, separating them before the decay occurs, as the object is then effected with less loss of the substance of the teeth," met with no favor in the report. The second edition of Dr. Taft's "Operative Dentistry" is noticed and commended for many improvements in its style; some of the author's statements are criticised, and regret expressed at the absence of any details in regard to the treatment of dental periostitis and alveolar abscess. The third edition of Dr. Harris' Dictionary, revised and enlarged by Dr. Gorgas, is very highly commended as a vast improvement on the former editions. The work is said to be as perfect as any dictionary of a science or art, running before it at so rapid a rate, can be; forming a lexicon in which can be found nearly every term belonging to the nomenclature of dentistry. Dr. Watt's "Chemical Essays" come in for hearty encomiums, both in relation to the matter and its mechanical dress. The beginner will find himself irresistibly drawn on in these pages to a paradise of beauty which he becomes eager to explore; and the student, at the close of his term, will find new ideas so quaintly and forcibly expressed and clearly illustrated, that they will become indelibly fixed in his mind, and ever ready when their principles are required in his practice. The author is said to treat his subject in a truly poetic spirit, and in the most animated nature imaginable, while in his highest flights

he does not leave his subjects trailing in the mud, like the too heavy tail of a kite, but carries it along with him clearly and beautifully, in the full sunlight of science, evolving principles with scrupulous and mathematical exactness. Attention is given to our periodical literature—the DENTAL COSMOS, *Times*, *Register*, and *Journal* all being commended to the support of the profession. In regard to the latter, the report expresses the opinion that its value would be greatly enhanced if much that is but remotely allied to our specialty could be displaced by articles of a more strictly practical nature. This remark is extended in its application to the other dental journals. The report further complains, that in all our dental journals there may be found articles of interest to our profession, showing considerable research on the part of the writers, which at the same time exhibit reprehensible carelessness in their preparation for publication; and then, again, a writer occasionally expends his force in his composition, and in impressing upon the minds of his readers the importance of the subject that he is *about* to treat, but which ever coquettishly eludes his grasp. The former class, while they annoy, instruct; the latter only annoy and disappoint the reader. The feeling of the profession is stated to be one of dissatisfaction with present attainments; no improvements astonish, and no discovery startles, the supreme feeling being a longing for something yet out of reach, and for which they eagerly look to the dental journals, as the *avants couriers* that herald each advancing step. The report recommends a more liberal pecuniary support as the most effectual remedy, to be heroically applied by every member of the profession, for any evils that may exist in our periodical literature.

The report on Dental Histology was presented by Dr. S. P. Cutler, of Holly Springs, Miss. It reviewed the statements and theories of Kölliker, Virchow, Tomes, Beale, and other investigators of the structure and formation of the dental tissues, and announced the results of his own microscopical observations in the same field.

Dr. McQuillen gave an exceedingly interesting description of a visit to the Army Medical Museum at Washington; having passed the greater part of a day and evening in inspecting the resources of the museum, and the achievements of Drs. Woodward and Curtis in micro-photography. Dr. Woodward had demonstrated to him most conclusively that with a one-eighth objective of Wales, amplified by the introduction of an achromatic concave lens (made by Tolles) at the bottom of the draw tube, and an ordinary eye-piece, the same results could be attained as with a fiftieth of Powell & Leland, which, in view of the delicacy of these lenses, and their costliness (the one-eighth costing $65, while the fiftieth cost over $300), was a consideration of very great importance. An exhibition of the micro-photographs, in the evening, with the ordinary magic lantern, illuminated by the calcium light, had afforded him much satisfaction, on account of the clearness and sharp-

ness of outline in the objects thrown on the screen, proving much more serviceable for the demonstration of animal structures before a class of students than the gas microscope. He presented these observations, hoping that those who are to teach in the various dental colleges, during the coming winter, will avail themselves of every possible means for presenting microscopical knowledge to their classes.

Dr. Judd, of St. Louis, took exception to the discoveries announced by Dr. Cutler, on the ground that it was a well-settled rule among scientific men that any new discoveries should be accompanied, on their announcement, by such details of the processes passed through as would enable others to go over and verify each step of the investigation. At the time that Tomes demonstrated the existence of fibrils in the dentinal tubules, the existence of ultimate nerve-fibres had not been demonstrated by Beale; but the latter investigator had since discovered that the germinal matter of the dentine penetrated the tubules, and had seen that the ultimate nerve-fibres break up and penetrate the germinal matter. The dentinal tubules, being one ten-thousandth of a line, can of course be penetrated by the ultimate nerve-fibres, which are only one hundred-thousandth; and their presence fully and satisfactorily accounts for the sensitiveness of the dentine. As to the theory that the dentinal fibrils of Tomes were a post-mortem product of the coagulation of albumen, it was only necessary to recall the fact that albumen does not spontaneously coagulate.

Dr. Atkinson said he had never yet been able to see the termination of an ultimate nerve fibril, and did not think any one else had seen it.

Dr. J. S. Latimer, of New York, exhibited, under a microscope belonging to Dr. Taft, a section of a perfect adult canine tooth, showing interglobular spaces, colored with carmine, with the dentinal tubuli passing across them. He remarked that this specimen had a historical interest, as it was an additional confirmation of the position maintained by Dr. McQuillen, which had been so much controverted by others.

Owing to the great amount of business pressing, a resolution was adopted allowing members to write their views, on the subjects of the various reports, and send them to the Publication Committee.

The Association then fixed the hour of final adjournment for 6½ o'clock P.M.

After a recess of a couple of hours the Association resumed business. The following amendments to the constitution, proposed by Dr. B. F. Spellman in 1866, were adopted, namely:

To insert between Sections 2 and 3, of Article III., the following:

"To be entitled to representation in this Association, dental societies shall be required to adopt or substantially recognize its Code of Ethics."

And insert between Sections 4 and 5, of the same article, the following:

"Any member of a local or State association who is expelled from the

same shall cease to be a member of this Association from the date of his expulsion."

An amendment, changing the time of the annual meeting from the last Tuesday in July to the first Tuesday in August, was also adopted.

The resignation of Dr. J. A. Perkins, as a member of the Association, was laid on the table.

On motion of Dr. Bogue, the rules were now suspended, and the following order of business was adopted, to go into effect at the commencement of the next session:

1. Meeting of Executive Committee; filling vacancies therein; examination of credentials; payment of dues.
2. Organization of the meeting—10 A.M.
3. Calling of the roll of qualified members.
4. Reading of the minutes and action thereon.
5. Reading and consideration of the stated annual reports from the standing committees, together with voluntary essays upon the same subjects, in their consecutive order.
6. Report of Executive Committee.
7. Balloting for place of next annual meeting.
8. Election of officers and members of Executive Committee.
9. Appointment of standing committees.
10. Instructions to the permanent committees.
11. Unfinished, new, and miscellaneous business.
12. Adjournment.

It was also decided that fifteen should be a quorum for the transaction of business.

The Committee on Operative Dentistry was next called, but there was no report.

The Committee on Mechanical Dentistry reported, through its chairman, Dr. B. T. Spellman, of Warren, Ohio. He noticed, in order, the several materials in use as bases for artifical teeth. As to Colburn's material, the report agreed with the manufacturer that it would answer for temporary use, not to exceed a few months. Newbrough's rubber being prepared by a new process, the committee are unable to report whether it will stand the fluids of the mouth or not. It possesses the same properties as dried vegetable ivory, and that soon softens in the mouth. The wicked raid made by the rubber company had induced some good men to be too sanguine of it. The Simpson rubber has disappointed the profession. Dr. McClelland was invited to come before the committee and explain his process, but he neither came nor replied. Of the merits of this material they know nothing, but are glad to report that there is much talent and industry devoted to the discovery of something which will take the place of rubber. The porcelain base is recommended as growing in favor and unsurpassed for cleanliness; the contour of the face is as well restored by it as by the

platina and continuous gum work. There is no trouble in making an upper or under set; it can be ground to fit the plaster cast in about the same time needed to get up a set of rubber blocks; the marks of the stone to be obliterated by a coating of gum enamel fused on afterward.

Artificial palates have been simplified to such an extent as almost to render staphyloraphy obsolete.

The committee reported no improvement in the status of mechanical dentistry, the advent of rubber having driven the best men from the laboratory in disgust. They recommended only gold for partial cases, and Dr. J. Allen's continuous gum as the ideal fully attained in supplying lost teeth and restoring the contour of the face.

Dr. A. W. French, of Springfield, Ill, on behalf of the Committee on Prize Essays, reported that no essays had been presented, and the committee was inclined to think its title a misnomer. The Chairman, Dr. French, presented an essay on the necessary professional qualifications for the practice of dentistry. He did not favor the passage of restrictive laws; he doubted their agreement with the institutions of the country; he would rather rely on the profession protecting itself by suitable ethical regulations in the local societies.

Dr. Corydon Palmer, of Warren, Ohio, from the Committee on Voluntary Essays, read a paper on taking partial impressions.

Dr. C. R. Butler, from the Committee on Dental Therapeutics, reported that he had seen the best results, in treating sensitive dentine, follow the use of carbolic acid and the acetate of morphia; he did not consider it safe, however, under all circumstances. He had found tincture of aconite root to work favorably in cases of facial neuralgia or peridontitis. Chloride of zinc, in varied dilutions, is a valued remedy in the treatment of many oral diseases. He did not perceive the advantage of phosphate of lime to remedy defective dental tissues; he believed there is not a lack of material but of assimilative power in the organism.

A special committee, of which Dr. Kennicott was chairman, on Neuralgic Affections, was given further time, with instructions to report at the next session.

A special committee on Instruments and Appliances, consisting of Drs. Shepard, of Boston; Bogue, of New York; and Smith, of Cincinnati, reported improvements in dental chairs, by Drs. J. B. Morrison, O. C. White, I. A. Salmon, and W. M. Butler; a pneumatic mallet, by B. Bannister; an automatic mallet, by I. A. Salmon; hand pressure and mallet pluggers, by S. C. Taylor; an improved regulator for controlling the heat in making nitrous oxide gas, by F. Searle; an automatic apparatus for the same purpose, by A. W. Sprague; an improved pin for artificial teeth, by J. A. Mason; pluggers, excavators, nerve instruments, etc., of improved patterns, by S. S. White; extension bracket, with gas annealing lamp combined, by Buffalo Dental Manufacturing

Company; a compressor for closing flasks inside the vulcanizer, by G. Hays; a porous duct compressor, by A. P. Southwick.

The reports of all the committees having been received, they were referred to the Committee on Publication. A few minutes were allowed Dr. McClelland, which he used in stating the good qualities of his base for teeth; he threw a number of pieces to the ceiling, and about the room to demonstrate their strength. At half past six o'clock the President rose and congratulated the Association on the happy termination of its session, and the adoption of the amendments to the Constitution and By-Laws. He said it appeared, on the first and second days of the session, as though the constitutional restrictions were broken down, and we were floating to chaos; but better counsels had at length prevailed, and the Association was now on a better basis than ever before. Thanking the members for their kindness, and encouraging them to the highest efforts for professional advancement, he declared the Association adjourned to meet on the first Tuesday of August, 1869, at Saratoga Springs.

BIBLIOGRAPHICAL.

TRANSACTIONS OF THE AMERICAN DENTAL ASSOCIATION FOR 1865 AND 1866. BOSTON: ALFRED MUDGE & CO. 1868.

THIS volume of Transactions, whose publication was unavoidably delayed by circumstances over which the Publication Committee had no control, has come to hand, and embraces the proceedings of the AMERICAN DENTAL ASSOCIATION at Chicago and Boston, two of the most interesting and instructive meetings ever held by the dental profession; a fact which will be fully demonstrated to those who were not present at the meetings by a careful perusal of this volume. In addition to the reports of committees, volunteer essays, and the discussions thereon, which were conducted with marked ability and evidences of extended research on the part of the participants, the eloquent addresses of the lamented Brainard and Prof. Davis on the relation of dentistry to general medicine, enhance the value of the work by directing attention, in appropriate and forcible language, to the bond of union existing between the specialties of medicine and the mother science, and that intelligent and successful practice in any department can only rest upon a thorough knowledge of Anatomy, Physiology, Pathology, and Therapeutics.

Should those querulous and fault-finding persons who never do anything themselves, but are always ready to point out the deficiencies of others, ask again "What has the American Dental Association accomplished?" it will only be necessary to point to this volume of Transactions as the best response and most ample refutation of the implied calumny.

Dr. Allport, in his address of welcome at Chicago, said: "Should this Association adjourn *sine die* to-day, and never hold another meeting, yet sufficient good has already been accomplished by it to fully vindicate the wisdom and foresight of those who projected it and have done the most to sustain it." With additional force this remark may be applied to the Association in connection with this volume of Transactions (which would reflect credit upon any scientific body); for although the folly, not to say madness and ignorance, of others may mar its usefulness, or even destroy it entirely, the fact of its existence, and the powerful influence exercised by it over the profession, in organizing local societies all over the country, and thereby stimulating a desire for self-improvement on the part of individual members, is placed imperishably on record. The most enduring monument of a country, a profession, or an association, is its literature. J. H. McQ.

PUBLISHER'S NOTICE.

THE full report of the proceedings of the American Dental Association occupies so much space in the present number, that although eight pages have been added, a number of communications already in type have been unavoidably laid over until the next issue.

CORRESPONDENCE.

"THE RUBBER SUITS IN PHILADELPHIA."

PHILADELPHIA, July 23d, 1868.

TO THE EDITORS OF THE DENTAL COSMOS:

Gentlemen:—On the 3d of July I read an article in the *Dental Times*, written by Prof. T. L. Buckingham, on "The Rubber Suits in Philadelphia," which reading decided me to attend a meeting held on the evening of that day in the lecture-room of the Pennsylvania College of Dental Surgery. That meeting was presided over and addressed by the distinguished writer of the article alluded to. Had the attendance of the dental profession thereat included all who would read the *Times*, I should have been satisfied to let it pass, as then explained by him; for, on taking the chair, or in an early part of the discussion of the business of the meeting, Dr. Buckingham made a short statement of the animus and motive of that composition, in which he so thoroughly and handsomely disclaimed any intention to censure either the committee selected by the contributing dentists at the meeting alluded to in his article, or to belittle their labor or that of the persons employed by them, that no one who heard him speak could believe that he maintained any suspicion that the committee had been remiss in its duties or failed to apply the funds judiciously. But there will be hundreds or thousands of

readers of Dr. Buckingham's rubber suits in the *Times* who did not hear his retractions at the meeting, and that consideration determines me, for the sake of my associates in the case, and for my own sake, to solicit space in the wide-spread pages of the DENTAL COSMOS to set right before the dental world the action of Philadelphia dentists in relation to *their* "rubber suits."

I have no controversy with Dr. B., although I shall seek to controvert, in several points, his statements, inferences, and deductions. I accept his article in the *Dental Times* as a plain reflection and simple narration of an ugly fact—which is, the wide-spread feeling among dentists that they are the victims of a great swindle, which is being perpetrated upon them by the rubber men with the Goodyear and Cummings patents. They know they are being SOLD by a company of speculators, and the knowledge gives color and bitterness to all they say or think on the subject. Unfortunately, it does more—it clouds their reason and distorts the facts and certain issues of the case. Assuming it to be wrong, and denouncing it as wrong, they seem to think that to thus discover and denounce its character will insure its defeat. Dr. B. has breathed and moved in this atmosphere; considering which, and taking into account that the rubber combination had selected him as a representative man and a first-class subject on which to test their leeches, we are not to wonder that he lashed out a little, and even hit some of his friends. Dr. B. is human, and need not be expected to preserve perfect equanimity when receiving notice of a "snap-judgment" *settling* with the agent of the Dental Vulcanite Company—even though he be polite with *settling* parties—and writing an article on "Rubber Suits" in the same week of the dog days.

To this introductory I am constrained to add, that while professing to reply to Dr. B.'s article, and principally doing so, I will all along seek to state truly what was accomplished by the few dentists in Philadelphia who engaged in any attempt to resist the organized effort of the Goodyear Dental Vulcanite Company to levy a tax upon that popular form of artificial dentures called "rubber work." This tax is to go into the pockets of a corps of smart speculators and enrich them only. Not one dollar of it is to go directly to the inventor of the material, nor to him who first applied it in dental work, nor to those who, by experiment, study, and skill, had reduced it to system, constructed apparatus suitable for use in a dental laboratory, and so taught it to the profession and bestowed it as a valuable boon to community, enabling a poor person with a maimed mouth to obtain a comfortable and useful substitute at a small cost. It is this knowledge that the parties claiming of them have no equitable right—that they neither invented rubber nor applied it—which makes dentists so unanimously resist the imposition. This, too, I repeat, prejudices their judgment upon the case and prevents

them from fairly seeing how complete is the legal meshwork of the net in which they are inclosed.

I take issue with the expression, "weak-kneed ones," which the doctor makes use of in speaking of those who, being prudent, hating litigation and worry—timid and impressionable, if you choose—did yield to claims and threats of Dental Vulcanite Company agents, and settle. I find that many of these are the most reliable aiders of any hopeful resistance, sure friends, and paying contributors. Among them I now class Prof. B. himself, who, though he had settled with the agent and found him polite *to settlers*, did openly, at the meeting, July 3d, offer to contribute toward defending "one case, at least, through the court." He gave no sign of being "weak-kneed;" neither does Dr. Truman in his letter to Josiah Bacon, on page 23 of the *Times*. A goodly proportion of those who settled at first are as true and helpful friends as they, and should not be called irritating names.

The doctor says, "Three or four dentists were notified to appear at court." Eight suits were instituted against four Philadelphia dentists,—a bill for infringement of the Nelson Goodyear and also the Cummings patent being filed against each. He then goes on to say: "An association was formed, the object of which was to collect funds, employ counsel," etc. "When this organization was about completed, some parties stated . . . a number of dentists were willing and ready to contribute to a fund to defend a suit, but were unwilling to join an association for that purpose, and a proposition was made that the association be disbanded and a committee appointed to carry out its intentions. This proposition, after some warm discussion, was agreed to. This committee . . . . commenced collecting funds to carry out its object, with the understanding that they would defend any one who subscribed to the fund."

I quote nearly every word of this part of the doctor's article. He is evidently sore, and writes unkindly. I separate that which refers to dropping an organized association and merging into a simple committee selected to carry out unrestrictedly the one wish of the contributors, because I did all I could at the time to make the Philadelphia effort take the form it did. Happening to see some of the parties engaged in framing the constitution and other machinery of the association, I was so impertinent—being myself out of practice, and therefore out of the fight—as to seek the gentleman who had been named as chairman of the committee on organization, and urged upon him the impolicy of following the Boston and New York Association plan. I so far impressed him with the reasons for dropping the society form and adopting that of a simple club of resistant and aiding subscribers, that he presented these reasons, with his own, to those of the proposed association whom he could see, and thus its form was modified. At that time, when a through and through resistance was fully contemplated, it was unwise to state these reasons too openly. They may now be told without injury. In a suit at law

or in equity the sympathy of the judge and jury should be propitiated and secured if possible. In these suits the prosecution was made by a chartered company—a mere moneyed corporation. The defendants, on the record, were individual dentists: the damages of the charged infringement a hundred times less than the costs of defending such a patent suit. In Boston the plaintiffs were careful so to question every witness for the defendant, as by their answers to exhibit that a defense, nominally that of one dentist against a powerful corporation, was carried on by a compact society with abundant funds, great numbers of able contributors, and nearly every one of their witnesses pecuniarily interested in the result, and bound to share the expenses of defeat. This effectually neutralized the sympathy. Subsequently they did not fail to call forth answers which established a similar balance in the New York suit. It was desirable to avoid this disadvantage here, so that, at the most, all they could draw out of any witness would be: "I have contributed toward defending this suit, but I am not a member of any association for such a purpose, nor am I pecuniarily obligated to pay toward it any further; or secured against damage to myself if I should be prosecuted."

It was desirable to set aside all proof of an association indicating joint stock resistance, and, while not denying that they were aided in the defense, to preserve such a show of individuality as would make all the sympathy of contrast between strength and apparent weakness belong to the side of the dentists. Nothing is more certain than that a just judge will be mild in ruling against an individual defending a suit when opposed by an organized and wealthy company of speculators, even if that individual is aided by money subscriptions of his professional brothers.

Another reason was, that a defense conducted by a society which had stated meetings must be exposed by reports. Liable as the dentists would be to have in their society the paid agents of the enemy, great harm would ensue by exposure of their plans. And, not least reason of all, many would contribute money, and intrust it to the hands of a committee to aid a defense, if they were not required to commit themselves as members of a society to pay costs and damages—unknown in amount—incurred by pledging a defense to every member; and if left free to settle for a license for their own office, when in their judgment it was their business interest to do so; and not prejudiced with the Dental Vulcanite Company in settling, by being members of a resisting association.

I am free to avow that, at a time when I had no idea of being "assistant" in the defense, I urged these reasons on those whom I knew to be the largest contributors.

I submit that they are good; and if they were not made known at the time to so important and efficient a member of the disbanded society as Prof. B., it could only have been for lack of time or opportunity; for, with a statement of them to him, his approval and co-operation

were certain. Do I mistake in judging that he would aid any effort even now to defeat the hard rubber tax?

I doubt the correctness of his statement, that they—the committee—"collected funds with the understanding that they would defend any one who subscribed, until at least one case had been decided by the court."

How could the committee undertake to do any more than faithfully administer, in the line of defense, the money intrusted to them! They may have thought that Philadelphia and the district surrounding it would furnish all the funds necessary, although suits were already begun, the initiatory steps of defending which called for more money than the subscription roll amounted to. But no authority can be found for the statement made by the doctor as above, that for any dentist's five or fifty dollars, they would insure him against Josiah Bacon and his satellites. I think a statement more nearly true would be made thus:

"The Goodyear and Cummings party have sued a number of dentists. Personally, they are unable to defend a patent suit of such magnitude. We are a committee chosen to collect subscriptions to defend them. By aiding them you may save yourself. Unless we do it thus, all will go by default."

I also am informed that the money was subscribed expressly to begin a defense against the suits already started, without any pledge or responsibility at all. Moreover, a large portion was given by dealers in dental goods, who had incurred no liability.

My connection with the defense began after Furman Sheppard, Esq., had been secured by the committee as counsel.

Previous to this, I had consulted in a friendly way with the president of the committee, and had aided to induce Mr. S. to accept $500 as a retainer in these cases, which was about all the funds collected at the time. Mr. Sheppard was clearly of opinion that he would not be doing justice to himself by accepting less than double that amount in two important patent suits for a company of individuals. Having been for a great many years a client of Mr. S., I had influence with him to get him to accept half his proper retaining fee, and afterward to do much more than a retainer pledged him to do.

Subsequently I attended a meeting of the committee by invitation. Dr. S. S. White, Dr. Truman, and Dr. Jack were present, and they were the only ones whom I ever knew in the case. Dr. W. briefly stated to us (what he stated at the meeting, July 3d), that before accepting the position which he occupied as president, and the trust of applying the money of subscribers to defend these suits, he had paid able counsel a large fee, personally, and submitted to him the written opinion of counsel employed in New York and the West by dental associations, in which they had considered well and noted the available points of defense which could be made against the Goodyear and

Cummings patents; that his counsel agreed with those others, and held that there did exist, and were available, sure means of defense for dentists against the Cummings, and probable ones against the Goodyear patents. I was obliged to express myself to the committee at this meeting as unconvinced. I said then, and have too frequently been obliged to say since, that I was unable to find anything on which we could make a safe stand against these patents in court. (As, for instance, when the New York case was in progress, and stuck for want of funds, I met their agent here and had a free talk with him. It was true that, in the case of Wait, Judge Nelson had refused a temporary injunction because, for one reason among others, there was some cause to believe that Goodyear had made a sort of dedication of his patent, so far as it was applicable to dentistry, by allowing its use to those who bought prepared gum of his assignees expressly for that work. But a full examination of what they expected to maintain on "dedication," or "dishonest withholding of his process in his specifications," and the plea "that true hard rubber could not be made by a strict adherence to his described process," did not convince me that there was any chance of success, on these points, with their experts and witnesses. So I felt constrained to say we were not justified in joining to aid them, when to say so seemed like actually aiding the enemy.)

Nevertheless, although I doubted, the committee were decided to retain me as expert, and I agreed to study the case and endeavor to discover testimony. They believed that dentists were aroused all over the United States, and it would be eliminated. We come now clearly to the main statement of the doctor which has provoked this reply.

"The lawyer or the assistant, I do not know which—it probably took both—wrote out an answer and had it printed, leaving blanks so that it would answer for all cases that might come up, which was handed into court in reply to the cases then commenced."

Thus at one "swing around the circle," this veracious historian relates what he did not know, belittles what he did know, and either falsifies what he knew or undertakes to relate that of which he was not informed.

If we pass over his wholesale detraction of persons he has no acquaintance with, and work of which he has no appreciation, how is he to be excused for thus contemning and censuring the administration of the committee! He knew them, and knew that each one of them was at least his peer in the science and art he professes, in business ability, in integrity, and in good standing with the profession and community.

A few hours after the *Dental Times* was issued, Dr. B. stated—being face to face with the committee and most of the subscribers to the "Eleven Hundred Dollars," at the meeting, July 3d—that he wrote off-hand and in haste, to save himself the trouble of replying to the letters of numerous correspondents, and fervently disclaimed any in-

tention to censure anybody. He was not himself aware (he said) that what he had written would bear such a construction, until informed that it did. My readers have, by contrasting the article and his retraction, the means of estimating Dr. B. and his "Rubber Suits." It is evident that Dr. B. had the "*answers.*" Himself a defendant, contemplating settlement or resistance, going to court, being also a ruler in the synagogue, a teacher of others, a prominent man in the profession, looked up to, consulted, and publicly replying with what professed to be a succinct history of "The Rubber Suits in Philadelphia," in a magazine like the *Dental Times*, published under the sanction of the faculty of one of the leading colleges of dentistry in the world,—one might expect he would at least have read and taken fair means to know the value of that "answer" before presuming thus to contemn it.

I assert that neither the lawyer or assistant—or "both of them"—can be accredited with having produced those answers. They are the valuable concrete result of the study and skill of all the lawyers and assistants who have been employed in all the defenses against all the suits which the hard rubber men have prosecuted, from Toland's down. So far from being dear at $1000, they have probably cost over $20,000, and the study and research of many men who write far more carefully than Dr. B.; who write sentences which indicate and cover large issues, and which must bear the scrutiny of judges, courts, and adverse lawyers,—such writing as it is expected to maintain by proof on oath, and not to be retracted wholesale on meeting face to face those of whom they have written.

We were obliged to buy from the Clerk of the Circuit Court of the Southern District of New York a copy of the answer in Goodyear and Duncan *vs.* Wait (commonly spoken of as the New York case), the leading counsel there having refused us one of the printed copies "with blanks," because it was HIS answer, and he would not consent to its use in any case where he was not retained, although the enemy had it served on him, and might learn from it all he could. We had all the other answers which were worth consideration, in all the suits, many of them being supplied to the president of the committee, by friends aiding in their conduct. The whole of the original papers in the Toland suit were kindly loaned to me for copy by Dr. W. M. Hunter.

Adopting the New York answer as the basis of our reply to the Goodyear, and that of the Boston answer in Dr. Wetherbee's case to the Cummings suit, and comparing, collating, verifying, and adding what seemed judicious, we ("it probably took both") framed an answer in such a way as we thought would best serve to make the prosecution believe we meant a full defense, and intended to stand a trial here. To do this involved a thorough study of both the N. Goodyear and Cummings patents in time far too short for such a task.

We had our answers printed (that is true, doctor), and left blanks in

them because they were needed not only to fill in various names and dates, but also in order that if, in the progress of the suit, it became necessary to make an amended answer, it might be done without the expense of printing again.

We also "had it printed," as much of it as was common and suitable as an answer to suits of these hard rubber men over the country, so that dentists in other places, who might be attacked, could have put into their hands the first step in a defense, and, by employing counsel to fill up and file them, gain time to act advisedly, or put themselves in connection with some defending association.

We printed one hundred copies of each answer, and have supplied them, whenever called on, to parties who were threatened or sued.

The answers to our eight suits, or six of them—for one of the four parties proved to be a friend of the enemy—were carefully filled up, those replies which it was injudicious to make common being written in; but to get them signed and sworn to was, with some of the defendants, a matter of much difficulty. One of them had to be hunted up and coaxed and urged to do it. He argued that nothing would ever be done about it, and though he knew that his cases were defended, has never paid one cent of his subscription. I wish Dr. B. had been included among these. He desired defense; desired to go in and take his chances with, and share the fate of his resisting brethren. He was a payer and a worker, and deserved such protection as could be given with the means at our command,—much more than one at least of those whom we shielded so long.

"The company's counsel," continues Dr. B., meaning, doubtless, the Philadelphia counsel for the Goodyear Dental Vulcanite Company, "did not, for some reason, push these cases to trial, but let the matter rest until last January (1868), when several new suits were commenced against other parties, and, unfortunately, I happened to be one of them." It did not seem to occur to the doctor that perhaps that printed answer, to which no replication has yet been made, might have aided to produce that failure to push those cases. Nor is he, in any part of his history of rubber suits, disposed to admit that perhaps the committee, counsel, and assistant of the defense organized for the suits originally started, may actually have done something to hold the prosecution in check The report of the committee made at the meeting—being a statement of what had been done, listened to and approved by the individuals, in person, who intrusted the matter to them—relieves me of any need to speak for them. I hope that report may at some time find its way into print. Doubtless the committee would furnish a copy of it to the *Dental Times* for publication, if desired. I noticed at the meeting that several members of the committee then present requested any one who felt aggrieved or not sufficiently informed by the report, to question them or state their complaint. None did. The doctor himself (presiding) was

satisfied with the committee, satisfied with the report, satisfied with his settlement, enjoyed his martyrdom, and refused to have his costs paid out of the funds in hand. He assured his brethren that, having been skinned, he rather liked it than not, and advised them all to prepare for the flaying knife and to accept as his experience that they would be "treated better by the (flaying) agent than by our own lawyer." I do not propose to follow the doctor into the personal part of his article. I am sorry he was not defended, but with his defense I have nothing whatever to do. I regret that Mr. Sheppard did not put in an appearance and file an answer for him, although I am quite certain that to do so would have caused some recrimination and done him no good.

There can be no harm in saying, just here, a few words completing the personal history of this case, disingenuously withheld in the doctor's article, but brought out at the meeting. Mr. Sheppard saw the doctor at his office and went to court with him, supposing him to be one of his clients for whom he had appeared. Told in court by the clerk that it was not one of his cases, he nevertheless arranged the adjournment and then notified the doctor that he would require a fee for further service. Dr. B. was, in his conversation on that occasion, so undecided whether he would defend or settle, that he refused to instruct Mr. S. at all as to his wishes, and parted with him, saying he would take time to consider and make up his mind.

After this he was seen by Mr. Sheppard, for over half an hour, at the office of the counsel of the Dental Vulcanite Company, who therefore concluded he had gone over for settlement and license. That the president of the committee, in the mean time having called to engage Mr. S. to defend Dr. B.'s suit, failed to see him, may be regretted; but, under the circumstances above stated, can any censure attach to Mr. Sheppard for the default taken against Prof. Buckingham?

I was spoken to of his case, advised settlement, and deliberately declined to interfere with Mr. Sheppard's decision or action, or to try to influence him in that or any new case. We had done more with our means, and by Mr. Sheppard's influence, than had been done in New York with ten times the money. I did not consider Mr. S. retained by a host of subscribers to defend them all at any time against as many suits as the rubber men could bring. I considered him not half paid for what he had done. Having been retained by the committee in these suits at a small sum for him, he had a right to expect that a defense would be furnished, and that carrying it through would bring him large fees in addition to his retainer. My study of the case revealed the fact that for us in Philadelphia there did not exist an available defense. It is repugnant to me to say this. Other suits, especially in the West, are progressing with such defense as they are encouraged to think hopeful, and I would avoid an admission calculated to demoralize even the weak-kneed. Dr. B.'s injustice to "our own lawyer" provokes me to

say that Mr. S. was employed to defend parties who put no defense in his hands; for, with the single exception of Dr. Jack, who gave me a name and date considered at the time safe to antedate Cummings—but which I soon found to be two years or more behind his caveat—not one dentist in Philadelphia gave any aid at all.

The copies of patents, papers, and books needed in the study of this rubber case, were not even paid for out of the subscription funds, which were in adequate, but were bought by S. S. White and myself, and remain our personal property.

I told the committee of the only reliable or hopeful line of defense which I could discover, with such result as was explained to the meeting of July 3d by the president of the committee. In that explanation, Dr. White told the meeting that our committee, thinking favorably of the defense indicated, and which if successful would have broken the N. Goodyear patent, and made the Cummings comparatively worthless, went to Cincinnati at his own expense and met the committee of the Western dentists and their counsel. They offered to give $5000 toward developing that defense. But though our committee offered to double their own subscriptions (S. S. W. concluding to make his $1000), and personally called on a great number of dentists in this city, they found no response whatever to their effort.

Afterward the president, being loth to give it up while any hope remained, went West again for the sole purpose of being present at one of the trials, and to judge for himself if any portion of the defense gathered there could be made available for us—this, too, without charge to the subscription fund. In the progress of our examination, Mr. Sheppard devoted all the time to the case which it required. Probably twenty full mornings were given and many more short sessions, and he several times took home what I had prepared for examination.

It is an error to suppose that, because a man is an able and experienced patent lawyer, he can take up and master a new subject like this Dental Vulcanite one without severe study. We would gladly have mined and coined a defense in this case. To Mr. S., our lawyer, I had always to say that there did not exist either the testimony or the means on which to make a fight here. I was dead set against failure or involving our clients in an expensive examination which I was sure would go against them. If, on a hearing, the judge decided that the answer gave promise of a good defense, he would refuse to grant a preliminary injunction as prayed for in the bill, and appoint a master to take testimony. Before this "master" the parties would appear and give testimony to sustain the bill and maintain the answer. Day by day counsel, witnesses, and experts would be required to attend. This testimony being printed and given to the court, he would receive it with the arguments of the counsel on both sides, also printed, and reserve them for (study and) decision.

I do not think the cost of the examination in New York could have been less than fifty dollars a day, and it lasted several weeks.

The prevailing sense among dentists that this claim is unjust, and should therefore be resisted, clouds their reason and prevents them from seeing the difference between law and equity, and that by infringement they become legally liable to the assignees of these patentees unless they can make a *legal* defense.

This explanation may justify our care taken to prove all things and hold fast only what was sure, before incurring or advising such costs. Dr. B.'s idea of taking one case through the courts was, for us, absurd. A case on either the Goodyear or Cummings patent could not be made up and tried here so as to be fit to carry up to the Supreme Court of the United States, on points giving any chance for a valuable decision in favor of the dentists, for ten times the sum raised in Philadelphia.

The suits in Boston on the Cummings, and in New York on the Goodyear patents were made at great cost, even though many of the witnesses on our side gave their time and expenses free. They were ably conducted by counsel of undoubted ability. Yet I doubt if either of them will be carried up. The only parties intending to do so do not find them perfect for that purpose.

In the Supreme Court no witnesses are heard. New testimony cannot be offered. All must be risked on the testimony of record before the court below. The least failure to get in just what is wanted to carry the point will defeat it. The most skillful argument cannot supply the omission. I incline to add, that on the Cummings patent Philadelphia is not a favorable place in which to make up a test suit. Almost every witness would require to be brought from a distance.

Seeing just how helpless we were, Mr. S. took the only available, sensible course left to him. He put up a bold front, filed a perfect answer which indicated a serious defense, even hinting at new issues, and then made the opposing counsel understand that, if let alone, to see that as good an effort as they could make here was made in other places, and failed, our people would not be fractious, would not make needless and useless expense and delay.

This was accompanied by the assurance that if they crowded us here we would form an association—which we had not done—make common cause with the others, get the aid of what testimony the others had gathered, and make such a defense as, considering the notorious conservatism of our judges, would defeat them in their first attempt. That to force these suits would arouse the whole community of dentists in this district, who were now only slightly irritated, and convert them into pledged and active resistants. In addition, Mr. S. intimated his determination, if these suits were urged, to counsel all those who had taken license to refuse to pay while they were pending, and undertake to defend every one of them, on the terms of the license contract, in

so doing; whereas, if we were let alone, he would decline to advise at all in these license cases. Some of the parties were then asking our counsel as to refusing pay. These would perhaps join Dr. B. in considering themselves treated "coolly." With the doctor's case I had nothing to do, except that I advised settlement at a time when costs might have been saved, and my present impression is that Mr. Sheppard would not have been justified in defending any but the first suits, or others instituted near to that period, unless he could say to the counsel on the other side that he was retained separately. I may err in this, but if I am right, Dr. B., even if he had retained counsel and tried a defense, would have been cast about as quickly and for larger costs. I am not afraid to say that no one can now, for twice the sum of money used by the committee, make so successful a defense on even a single case as that which Mr. S. made for his clients. In this connection I desire to call attention to an extract from a letter of Josiah Bacon, Treasurer of the Dental Vulcanite Company, to Dr. James Truman, as published in *The Dental Times* (see July number, page 25). "I have paused with your city, to give every opportunity of investigation, that no complaint should be made, being assured by many of your leading men that this course would bring all around right."

Now, does any one suppose that Josiah Bacon, the active and engineering Mephistopheles of this whole skinning raid upon the dentists, got this idea—so ingenuously confessed in order to sanction and justify the harshness which will characterize his future action in Philadelphia—from any of our friends? Did he get it from any of the committee? Is it not most likely that his own eminent counsel communicated that assurance to him? I think so, because it is in exact accordance with the impression which I knew Mr. Sheppard designed to make. It indicates a great success achieved with beggarly resources, and in every way justifies the action of the committee in retaining such able counsel. The success is achieved. The time has passed for concealing it. With small means we gained double the time which New York was able to secure at large cost with a trial resulting adversely. Not a little of the credit of this is due to Mr. Sheppard's generalship. The character, wealth, and integrity of the committee aided it, for no one would suppose they would engage in any serious affair with slender resources. Their prudence and reticence in administering their trust and answering inquiries so as to conceal our weakness was perfect, and carried out so long as any benefit could result to the cause: carried, I may say, until the whispers and suspicions of discontented or jealous parties culminated in such an unjust expression as this letter of Dr. Buckingham, to which I have felt constrained to reply.

HENRY COY.

MEMBERSHIP IN THE AMERICAN DENTAL ASSOCIATION.

To the Editors of the Dental Cosmos:

At the late session of the American Dental Association, as you are aware, the question, "Is the American Dental Convention entitled to representation in the American Dental Association?" was referred to a committee of five, of which I was chairman, together with the credentials of certain delegates. We brought in a report, signed by four members of the committee, denying the right of the Convention to representation in the Association, on the grounds that it was not a permanently organized local society, as required by the constitution of the Association; and that it required no condition of membership other than a pecuniary one. The other member of the committee brought in a report that the Convention *was* a local society, permanently organized, and entitled to representation. On a division, after discussion, the minority report was adopted by a bare majority.

Since my return home, I have consulted the records of the Convention, and propose to put before the profession the official acts of that body in support of our position.

There are three points which I propose to prove:

1st. That the Convention is not a local society.

2d. That membership in the Convention is not permanent.

3d. That the Convention requires no qualification from any dentist, save a contribution to defray its expenses.

The present constitution of the Convention was adopted on the seventh of August, 1861, at New Haven; where it was presented by a committee, consisting of I. J. Wetherbee, B. T. Whitney, L. W. Rogers.

It consists of ten articles:

Art. 1 states the name—The American Dental Convention.

Art. 2 states the object—To promote the principles and practice of dentistry.

Art. 3 names the officers—President, Vice-President, Corresponding Secretary, Recording Secretary, Treasurer, Executive Committee of five.

Articles 4 and 5 state the duties of these officers.

Art. 6 provides that the Convention shall meet once a year, at such time and place as the Convention shall designate.

Art. 7 provides that such of the late officers and Executive Committee as may be present at the opening of any regular Convention, shall make such an assessment as in their judgment may be necessary to pay all the expenses; and no person shall become a member until he shall have paid the assessment, and registered his name with *pen and ink* in the book of records, which list of names shall immediately precede the records of the doings of the Convention. The amount of the assessment may be afterward changed by a vote of the Convention.

Art. 8.—Any dentist may become a member of this Convention on

the condition hereinbefore mentioned, unless objection is made, in which case he may be excluded by a vote of the Convention.

Art. 9.—Honorary members may be admitted by a special vote.

Art. 10.—This constitution may be altered or amended by two-thirds of the Convention after one day's notice.

In support of the first proposition, That the Convention is not a local society, I refer to Article 6 of the constitution, which leaves the place of meeting entirely optional with the Convention; and also refer to the practice of the Convention, since the adoption of the above-named constitution, meeting successively, in 1862, at Trenton Falls; in 1863, at Saratoga Springs; 1864, at Detroit; 1865, at White Sulphur Springs; 1866, 1867, 1868, at New York; 1869 appointed to meet in New Haven.

As to the second proposition, That membership in the Convention is not permanent, I refer to Article 7, which provides that *no person* shall become a member of the Convention until he shall have paid his assessment and registered his name with *pen and ink*. And, in further proof, I cite the evidence of the books, now before me, in which many of the same names appear, year after year, of those who are regular attendants, invariably preceded by the Secretary's statement: "The following persons signed the constitution, paid the assessment of one dollar, and *became* members of the Convention," notwithstanding that they had done the same thing before.

As to the third proposition, That no qualification is required of any dentist, save a contribution toward defraying the expenses, see Articles 7 and 8, as above; and I furthermore state, that the names of persons engaged exclusively in manufactures and merchandising, connected with dentistry, appear yearly in the lists of members of the Convention; and that the said persons have accorded to them all the rights of any other members.

Having established my propositions to the conviction, as I believe, of all reasonable persons, I deduce from them that the Dental Convention was not entitled to representation at the late session of the American Dental Association, the constitution of that body providing as follows:

Art. III. Sec. 1.—The members of this Association shall be exclusively practitioners of dentistry, holding their appointment to membership either as delegates from local institutions, or as permanent members.

Sec. 2.—The delegates shall receive their appointment from permanently organized dental societies and dental colleges in the Union, each delegate holding his appointment for one year.

The action of the majority of the Association in admitting delegates from the Convention was, therefore, in my opinion, unconstitutional; an opinion held in common with more than half the members of the Association, for there were many who confessed that they voted against their own convictions of the right of the case, through fear of giving offense.

The form of certificate adopted, with the new constitutional require-

ment (that local societies shall adopt the Code of Ethics), will, I trust, effectually prevent such an irruption as the admission of delegates from the Dental Convention threatened; but constitutions and laws are of no avail, if they are only made to be broken.

I am, Sirs, yours truly, W. C. HORNE.

SELECTIONS.

FROM THE CHICAGO MEDICAL EXAMINER.

"POSITION" IN THE TREATMENT OF CHLOROFORM POISONING. By E. L. HOLMES, M.D., Lecturer on Diseases of the Eye and Ear in Rush Medical College, and Surgeon to the Chicago Charitable Eye and Ear Infirmary.—The subject of anæsthetics does not fall specially within the province of your Committee on Ophthalmology; and yet, there are a few points which I consider of some interest in connection with the administration of ether and chloroform in ophthalmic surgery.

I have observed a few facts, in operating upon the eye, which I deem of very great importance, as bearing upon the treatment of patients presenting alarming symptoms during the inhalation of chloroform. It is not my object to discuss the comparative danger in the use of chloroform or ether, nor the circumstances upon which the danger depends. It has been my fortune to observe the administration of both agents in a very large number of cases, under the care of many different and eminent surgeons. I have also administered chloroform more than four hundred times myself. Till quite recently, I had never witnessed a single case in which there was any apparent danger to the patient.

Some time since, two male adult patients, to whom I administered chloroform, suddenly ceased breathing, the pulse at the wrist becoming at once imperceptible, the sound of the heart, however, being audible to the ear placed upon the chest. The removal of the chloroform, alternate pressure and relaxation of the chest, and cold water thrown upon the face, speedily aroused the action of the heart and lungs.

I may state that, in administering ether to a patient seventy-six years of age, the respiration suddenly ceased, although the pulse, very much reduced in force, continued. The appearance of the patient was alarming, the countenance being somewhat livid, cool, and haggard in expression, and the eyes rolled upward. Considerable exertion restored him.

Every surgeon has, not unfrequently, observed that chloroform produces considerable pallor, prostration in the action of the heart, arteries, and lungs, apparently without any imminent danger. In all such cases, as well as in the two just described, the danger seems to depend entirely upon syncope. I have never witnessed a case in which there was turgidity of the vessels and redness of the face, in which there was not also a regular pulse, and a regular, though often stertorous, respiration, causing, perhaps, a peculiar heaving motion of the head. On several occasions, as I observed this tendency to syncope, although I saw no reason for alarm, I directed, experimentally, my assistants to raise the foot of the table sufficiently high to place the patient with the head downward on an inclined plane of at least 40°. I found, invariably, that the pulse at once became fuller and more frequent, and that the color returned to the face.

Subsequently, in administering chloroform to a patient at the Chicago

Charitable Eye and Ear Infirmary, the breathing and pulse, almost without warning, suddenly ceased. Although the pulse and respiration had been quite good, there still had begun to be a peculiar "cold perspiration" upon the brow, and a cold, moist condition of the hands, which I attributed to the depressing influence of fear, under which the patient was laboring. I was watching the patient most carefully, thinking in this condition he should receive no more chloroform, when he ceased to breathe. His aspect was most appalling: the face and hands were cold and wet, the features pinched, muscles of the face relaxed, lids half opened, and the cornea turned upward. The foot of the table had not been raised fifteen seconds, the tongue having at once been withdrawn, before the pulse reappeared at the wrist and the respiration was re-established. Upon restoring the patient to the horizontal position, the pulse and respiration again ceased. The elevation of the foot of the table, however, again re-established the action of the heart and lungs.

Some time after this occurrence, precisely the same symptoms appeared during the inhalation of chloroform. The patient was a young, strong man. In this case, the pulse for a few minutes was growing less frequent, although the breathing continued quite strong and regular, till, without further warning, the pulse and breathing suddenly ceased. The appearance of this patient was as frightful as in the case of the other, just described. A similar mode of treatment restored at once the action of the heart, some seconds passing before the respiration was fully re-established.

I have had an opportunity, at the Infirmary, of demonstrating, experimentally, to students and physicians, more than thirty times, in cases where there was no apparent danger, and yet where there was a tendency to pallor and weakness of the pulse, that, in the position I have described, the cheeks became instantly flushed and the pulse stronger.

In administering chloroform I always use a napkin, folded several times, upon which the anæsthetic is poured in small quantities at a time, care being taken that a free current of air can pass to the mouth under the napkin. The patients are always in a horizontal position. I watch with great care the condition of the pulse and respiration; and yet, it is sometimes somewhat difficult to distinguish the difference between the effects of fear and those of the chloroform.

Whatever may be the obscure causes of fatal results from the use of chloroform, I believe the danger, in by far the larger proportion of cases, depends upon a tendency to death by syncope. To overcome this tendency, it is necessary to stimulate the nervous centres. This may be done by causing a column of blood to press upon the vessels of the brain. It is not sufficient to remove the pillow from the head and place it under the hips. It is necessary that the whole body be placed upon a steep inclined plane, to force as much blood as possible, by gravitation, into the brain. I believe this is of more importance than any of the methods usually described by writers on the subject. It should take precedence to the withdrawal of the tongue, artificial respiration, galvanism, or stimulants. This remedy can always be applied without delay, and can be followed by any others which may seem desirable.

I have dwelt upon this subject of position, because so little is said upon it, either in the best works upon anæsthetics, or in the reports of the treatment in fatal cases as found in medical journals. We have reason to believe that very few surgeons or obstetricians have ever placed a patient in the position described, in cases which threaten to

terminate fatally. I have employed large and frequent doses of bromide of potash, as recommended by Dr. Stone, both before and after the administration of ether, as also of chloroform, to prevent nausea, but have not observed any beneficial result. It is highly desirable to possess some agent to prevent nausea and vomiting, especially in the extraction of cataract, since the vomiting may cause the expulsion of the vitreous humor, and protracted nausea, and consequent loss of appetite, may prevent union of the corneal wound, by impairing nutrition.

GOODYEAR vs. NEWBROUGH.

BEFORE JUDGE BLATCHFORD

This was a motion for an injunction against Dr. Newbrough, the inventor of the so-called iodized hard rubber.

Plaintiffs claim that their patent includes all hard rubber, whether made strictly in accordance with the terms of their patent or not. That the hard rubber made by the defendant is a merely colorable difference.

The main point relied upon by them was that the defendant required sulphur in his process, and that the hardening process was due to the presence of this sulphur, and not to the iodine.

Yesterday the defendant introduced affidavits from Professor Silliman, of Yale College; Professor Chandler, of Columbia College; Professors Seeley, Engelhardt, and Wurtz, of New York, and Professor Torrey, the Assayist of the U. S. Assay Office, showing that the hardening was due to the action of iodine alone. The more fully to corroborate this, they attached nearly a hundred specimens of the rubber, in all forms and colors, made by themselves, and made without any sulphur.

The complainants, pretending a surprise upon this, demanded that the whole case should go before a chemical expert to decide upon the facts alleged. The defendant resisted this motion as being made merely for delay, and wholly unprecedented.

The judge refused the reference, stating that he never heard of such a motion being granted in this country, and that furthermore, the defendants had already procured *all* the first-class chemists in the city, and it would be unfair to them to have their opinions criticised, as they would be if he chose one who had not already expressed an opinion.

The complainants then withdrew their motion for an injunction, the defendant protesting against it, and claiming that he had a right to a hearing, having incurred so much expense in the preparation of the case.

The court decided that there was no power to prevent them from withdrawing their motion.

On defendant's motion, it was ordered that the complainant proceed immediately to take testimony for final hearing. The defendants then requested leave to have their affidavits and exhibits sent to such circuit courts as they might desire, to resist other motions, and more particularly to apply to set aside an injunction, granted *ex parte*, against one of defendant's licenses in Pittsburg, which the court ordered.

The case in effect tests the question whether the Goodyear monopoly can crush out all inventions, however made, and whether a man can be found with money and pluck to fight them to the Supreme Court.

Charles F. Blake and Mr. Pollock, counsel for complainants.

John A. Foster and S. D. Law, counsel for defendants.—*Evening Journal* (*Jersey City*), Aug. 14th.

PERISCOPE OF MEDICAL AND GENERAL SCIENCE IN THEIR RELATIONS TO DENTISTRY.

BY GEO. J. ZIEGLER, M.D.

Salivary Glands and their Secretions.—"The experiments of Heidenhain were chiefly made upon the submaxillary glands of the dog, but also on those of the rabbit and sheep. Nearly 120 animals were experimented upon. He considers that considerable differences in structure, corresponding to differences in function, may be traced between different salivary glands in the same animal, and in the same salivary glands of different animals. The submaxillary gland of the *rabbit* is more simple in structure than either that of the dog or of the sheep. The cells in the alveoli are soft and ill-defined, darkly granular structures; they possess a nucleus, and this alone becomes colored with the carmine solution. No difference is observable between those lining and those situated near the centre of the alveoli. The alveoli have no proper investing membrane, but are separated from one another by connective tissue, in the meshes of which are a few lymph-corpuscles. All micro-chemical reactions show that the cell protoplasm is rich in albuminous compounds; but no evidence can be obtained of the presence of mucus. The application of weak acids renders the protoplasm turbid, Stronger acids, in addition to this, cause it to shrink. Strong acetic acid occasions considerable enlargement, and renders it transparent.

"The submaxillary gland of the dog is a *mucus gland*, in which a continuous development of mucus-cells occurs, which break down to form the mucus, while their place is supplied by others. On superficial examination, no difference at first appears between the cells contained in the alveoli and those already described as occurring in the rabbit; but on the application of the carmine solution the greater part of each acinus is found to contain large transparent (not granular, as in the rabbit) cells, which remain uncolored, though the nucleus becomes red; and besides these, at one and sometimes at two spots of the circumference of the alveoli, a semilunar or sickle-shaped mass of darkly granular material may be seen, the presence of which was first described by Giannuzzi. This becomes deeply colored with carmine, and is composed of cells in close contact with one another. The distinction between the two sets of cells is still more distinct in the *cat*. The clear central cells of the alveoli of the submaxillary gland of the dog are, for the most part, of pear or club shape, possess a distinct investing membrane, and one or two highly refractile prolongations, which become tinted with carmine, chloride of gold, or osmic acid. In no instance, even with the greatest care, was Heidenhain able to trace a connection between the nucleus of the cells and these prolongations. The contents of these cells were poor in albuminates, and consisted almost completely of mucus; and in this respect, as well as in their distinct cell-wall, flattened nucleus, and caudate prolongations, formed a marked contrast to the cells in the interior of the alveoli of the same gland in the rabbit. Acetic acid precipitates the contents of the mucus cells in every degree of concentration. Mineral acids, when dilute, precipitate them, but re-

dissolve them when concentrated. The 'marginal cells,' constituting the semilunar mass of Giannuzzi are ill defined, and contain material rich in albuminous compounds, with a round nucleus.

"The submaxillary gland of the *sheep* presents two cell forms in its acini, but the granular albuminous cells are relatively far more numerous than the clear mucus-cells.

"The submaxillary gland of *man* agrees with that of the dog in its structure, and is, therefore, essentially a mucus gland.

"M. Heidenhain next enters into the consideration of the chemistry of that kind of saliva which is secreted under the influence of the chorda tympani nerve. The exciting agent employed was a magneto-electric instrument of ordinary size, rendered active by a small Groves' element. When the nerve was irritated by this means the secretion never continued to be discharged for any length of time, but after diminishing can, with a short pause for recovery, be again induced to take place with considerable activity.

"The chorda-tympani saliva of the rabbit is thin and watery, decidedly alkaline, and no reactions indicative of the presence of mucin can be obtained from it. Its solid residue amounted to 1·239 per cent.

"The chorda-tympani saliva of the dog contains mucin, and a very small proportion of albuminous compounds.

"In the sheep the amount of proteids in the same saliva is much more considerable than in the dog, while the proportion of mucin is very variable; and these characters of the saliva in the different animals correspond with the structure of the glands as already mentioned.

"An interesting result was obtained from the examination of this saliva in the dog, that the percentage proportion of solid constituents diminishes with the duration and rises with the strength of the nervous excitation, the difference being chiefly noticeable in the organic constituents; hence it might be said that the latter are formed by the gland during the period of rest, and, at the moment of excretion, are dissolved in the fluids poured forth by the blood; and Ludwig so explained the phenomenon; but Heidenhain shows that the increase is really due to the fact that the rapidity of secretion of the solid constituents rises in a greater ratio than the secretion of the water, that the nature of the solid which really augments is mucin, and that consequently, instead of the diminution on protracted irritation of the nerves being due to an exhaustion of the gland of all its stored-up solids, it is rather due to exhaustion of the nerves, which are no longer able to act as excitors to the glandular elements.

"Heidenhain proceeds to give a full and accurate account of the morphological elements of the saliva, among which he enumerates mucus-cells of the acini, peculiar transparent spherical bodies of variable size, and proper salivary corpuscles, possessing the well-known characters of amæboid cells. He has not found that the latter occur in greater numbers on excitation of the sympathetic than on irritation of the chorda tympani.

"After continuous excitation of the chorda tympani remarkable changes occur in the substance of the submaxillary gland itself. It becomes softer, its percentage proportion of water increases, and its solid constituents diminish.

"We have not space to follow Heidenhain closely through his experiments with the sympathetic; but some of the more important conclu-

sions which he believes his experiments establish may here be mentioned. Instead of admitting, with Eckhard, that excitation of the chorda tympani produces a secretion of saliva differing in kind from that secreted when the sympathetic is irritated, he believes that the difference is only one of degree. The saliva in both instances becomes more watery in proportion to the duration of the irritation, the quantity of mucus diminishing.

"Both kinds of saliva become richer in salivary corpuscles as the irritation is continued. Both are indebted for their production to impulses which cause a greatly increased pressure of blood in the capillaries. The chemical and morphological changes are, however, greatest in the chorda-tympani saliva On irritation of either nerve, increased development of heat occurs in the gland. Certain marked differences, however, do exist between the two kinds of saliva. That produced by irritation of the sympathetic is more concentrated, richer in solid constituents, than that obtained by irritation of the chorda tympani. The morphological elements of the sympathetic saliva only appear for a short time after it is first excited; they then gradually diminish and disappear, and the quantity of saliva thus obtained is also less, while it contains more mucus.

"Heidenhain was at first disposed to think this was to be explained by the action of the sympathetic on the vessels occasioning their extreme contraction; but this explanation is not satisfactory, since, if the current of blood be checked, and the chorda tympani excited, an abundant flow of blood still occurs. On the whole, he is disposed to admit that the formation of mucus and the secretion of fluid are associated, or simultaneously occurring processes, each of which is induced through the action of a special class of nerve-fibres. Both sets of fibres, which, for the sake of convenience, may be termed respectively mucus-forming fibres and secretory fibres, are contained alike in the sympathetic and in the chorda tympani, but in unequal proportion. The chorda contains very numerous, the sympathetic very few secretory fibres, relatively, to the mucus-forming fibres. Heidenhain considers he has positively shown that, by excitation of certain nerves, processes and metamorphoses may be induced, which occasion lively cell formation.

"Bidder found that on the application of a galvanic stimulus to the upper part of the cervical sympathetic detached from the vagus causes an immediate increase in the flow of saliva from Steno's duct in the sheep. According to V. Wittich (*Virchow's Archiv.*, bd. xxxvii. and xxxix.), this is due to increased secretory activity of the parotid gland, while Eckhard (*Henle's and Pfeuffer's Zeits.*, bd. xxix., and *Beiträge*, bd. iv. heft ii., Giessin, 1867) considers it to be the result of the expression from the gland of the store of the saliva which has accumulated in the ducts. F. Bidder, however, is disposed to agree with V. Wittich, from the results of his experiments on sheep, since he finds that galvanic irritation of the cervical sympathetic occasions not only an increased flow of clear and transparent saliva from Steno's duct, but causes a much greater quantity of blood to traverse the gland, while the pressure of the blood in the veins is augmented, and the veins themselves pulsate."—(*Brit. and For. Med.-Chir. Rev.*)

"*Oxygenation of the Blood.*—The influence which the oxygenation of the blood exercises on the vital functions has recently been demon-

strated in a very extraordinary manner by M. CLAUDE BERNARD. He injected the arteries of the neck with oxygenized blood, immediately after decapitation, with the view of ascertaining how far the phenomena of death were dependent on the withdrawal of the supply.

"He found that warmth and muscular sensibility returned, and even that perception returned to the eye, which moved when the hand was passed before it."—(*Medical Press and Circular.*)

"*Healing by First Intention.*—This is a history in detail by Dr. Wywodzoff, *especially as it concerns the blood-vessels in this event.* The author observes, in the preliminary notice of the results of his investigations, that he has made his experiments on the tongue of the dog, the rabbit's lip, and the *membrana nictitans* of the frog According to his experience, the tongue of the dog proved to be better than any other for such researches, for it is a part so rich in capillaries, and, separate from the body, is so easily injected. As the basis of his investigations, the author divides the whole process of healing by first intention into five periods, each of which, in different individuals, is much varied. Indeed, not unfrequently one can, in various spots in the same scar, perceive different phases of the reparative process.

"1. *Stagnation* period, lasting twelve hours (in the dog's tongue), twenty-four hours (in the tadpole). This is minutely described by Wywodzoff, as it has been previously by Billroth and others; it is marked by a stagnation of the blood in the vessels all around the edges of the wound, and by thrombus formation in the divided ends themselves. The finest lymphatics are by coagulation or by swelling of the neighboring tissue also obstructed.

"2. *Loop-formation* period, lasting about from the twelfth to the forty-eighth hour after the injury. In those parts of the vessels not thrombosed the circulation has not re-established itself, the force of the blood in them is heightened; whereby the acute and obtuse-angled vascular offshoots have become rounded, they are loops originated, which yet, by the same elevated force of the blood, broaden and lengthen, until at last the outermost wall of the arch turned to the edge of the wound yields and gives occasion to the formation of looped processes. At the same time, the edges of the wound have united by a gluey material—coagulated lymph, fibrinous exudation—between them is a great quantity of new-formed cells deposited. The latter either proceed from a division which takes place in the connective tissue corpuscles situated within the edges of the wound or from white blood-cells; possibly they owe their origin to both together. Wywodzoff's observations at least make it highly probable that the blood confined in the wound goes through the same changes as have been described by Billroth as characteristic of the organization of thrombus, *i.e.* the red corpuscles are gradually dissolved, and blend with the coagulable lymph in the intercellular substance of the recent scar, while the white blood-corpuscles multiply, and so at all events give occasion to the formation of those little white round cells which afterward become spindle-shaped.

"3. *Canalization* period, in the between-substance, which, for the most part, consists of newly-formed round cells; channels are opening out from the looped processes, which, without definite arrangement, without uniform law of continuance, are carried on separately in all directions. These are only visible by use of very high powers, as

bright streaks bounded by granulation cells; the current of the injection advances only as far as the beginning of these channels in the looped processes; this period ends on the fourth day at the wound.

"4. *Vascularizing* period, from the processes of the loops, progressive organization of the channels into blood-vessels, of very large diameter relatively, so that it forms a network of very small meshes. Proceeding from spindle-shaped cells, which, arranged in rows, give intimation of connective tissue disposition. This period generally lasts up to the tenth day.

"5. *Consolidation* period, characterized by this, that the between-substance, as regards firmness, takes on always more the character of proper connective substance, bounds to the vascular dilatation shortly being arranged, but then the lumen of the newly-formed capillaries little by little, to about a third, diminish. That some of them are again in this way brought wholly to obliteration, as one has generally hitherto assumed, is said not to be the case according to Wywodzoff's observations. The lymphatics are first formed in the scar when the cicatricial tissue is transformed from spindle cells into connective tissue fibres and the vascularization is come to a stand."—(*Schmidt's Jahrbücher* and *Brit. and For. Med.-Chir. Rev.*)

"*Reproduction of the Maxillary Bones.* By WM. H. ATKINSON, M.D. Read before the New York Medical Journal Association.

"MR. PRESIDENT AND GENTLEMEN:—I felicitate myself upon this opportunity of giving expression to doctrines long entertained and variously practiced upon, respecting the destruction and reproduction of the maxillary bones.

"There are three modes of expression of destruction (or death) of these bones.

"1st. Simple solution of the lime salts, without destruction of the matrix.

"2d. Caries or ulceration, destroying both matrix and earthy matter.

"3d. Necrosis, or death of considerable territory in mass by privation of pabulum.

"Could we agree upon what constitutes normal nutrition of bone, our work would be facilitated, for all these conditions of death of bone are but modes of interference by a presence adverse to this normal act.

"Every organ has its elements or tissues of which it is composed. In like manner there must be some distinct anatomical or primal element that enables us to distinguish one tissue from another.

"This act of nutrition, it is clear, then, must be effected for each tissue by its primal body or smallest individuality. This will enable us to perceive that nutrition, normal or abnormal, must be elaborated in the cell territories, within and around the cells; and hence is extra-vascular, and in 'the juices of the flesh,' or mucoid mass of pabulum (food for cells), which is nothing less than the perfectly digested elements of food; in this final and finest product of the digestive function, the blood proper, resides the life of the system.

"Anything that interferes, then, with the equable function of nutrition of bone-cells may be the cause of any form of disease or death to bone.

"The force that enables the cells to imbibe that which they need, and reject unfit qualities or excessive quantities of pabulum, is resident

in and about the cells, or that which amounts to the same thing, an appetency to the receptivity of this force holds its court in these occult territories. If, then, 'The life of the body is the blood thereof,' a text so often scouted, it is evident that the machinery by which this is conveyed to the remote portions of the body, must be in good working order to effect desirable results in nourishing old or reproducing new elements of tissues.

"The simpler forms of disease demand the simpler modes of management.

"1st. In the simplest forms of decalcification, with or without distension of the matrix, institute supporting treatment, locally and constitutionally. The local treatment may be effected by stimulants, astringent washes, and compress. The constitutional, by good feeding, air, sunshine, exercise, tonics, and agreeable surroundings.

"Should this not succeed in inciting absorption or conversion into normal structures of the unhealthy contents of a matrix in a short time, I would advise incision of the sac, and careful removal by washing out all the fluid contents.

"Immediately after this washing, distend the cavity by forcibly injecting a solution of the chloride of zinc, until the resilience of the walls will cause the piston of the syringe to fall back when the pressure is removed.

"The strength of this solution of chloride of zinc should range from 20 to 80 grs. to the oz. of distilled water, according to circumstances. For very susceptible patients, with low vital energies, the strength should be 30 to 60 grs. per oz. For persons of vigorous circulation and strength of body, I would use the maximum strength (80 grs.). For anemic patients and sloughing tendencies the minimum should be used. In the great majority of cases the injection of the zinc need not be repeated.

"That I may be clearly understood, permit me to state the object of using the zinc is to change the abnormal local condition, and stimulate the vessels to supply a colloid mass or magma to fill the vacant matrix of the bone, or pocket into which the new growth may be projected and matured.

"Another and more forcible reason for using the zinc after emptying the pocket or matrix of decalcified bone, is to prevent the formation of pus, sanies, or other debris of broken-down tissues which is so likely to occur in recent cases if left to themselves after evacuation.

"If asked for the rationale of this mode of preventing the formation of pus, etc., I would reply, so soon as the pressure of distention is removed by the tapping, the current force of the circulation in the capillaries has a tendency to push them with their connections into the chasm, thus relaxing and binding them so as to induce stasis of their contents, distention of their walls, and transmission of white-blood corpuscles so rapidly as to cause them to die and become pus-cells, which are incapable of being wrought into even abnormal tissue.

"I am aware that this very transit of the plasm and white corpuscles would be the most desirable condition of things, could it but be regulated so as to permit the building force to reproduce the connective tissue out of these lymph corpuscles, and thus work up the basis of the new osseous structure.

"There is a form of death of the margins of the alveolar process,

very prevalent, that is usually set down (justly or unjustly) to softening of the ligamentous structure and the calcigerous periphery of the alveoli by mercurialization. Where the softening involves a considerable depth of process, I have usually been able to refer it to constitutional condition. But where it is decidedly local, immediately under the margins of the gums, I have as frequently had cause to attribute it to local irritation from foreign deposit or injudicious efforts at keeping the teeth clean.

"All that is necessary in purely local cases, though they have encroached upon the attachments of the root to the socket, even to the end of the root, and half its circumference on one side, is to remove all foreign material, polish nicely, wash clean, and dress with the zinc.

2d. Under the head of *caries* or ulceration of the maxillary bones, I deem it necessary to say but very little, either of the doctrine of what it is, or of the mode of cure.

"In the first place, it is consecutive death of stratum after stratum of bone-cells.

"In the second place, the cure consists in scraping or rasping away the entire dead and dying surface; to be followed by scrupulous removal of the debris of the scraper or rasp, and the use of zinc as before indicated.

"3d. *Necrosis.* This, indeed, has been the opprobrium of surgery from the earliest times; and it is impossible to hasten with too much celerity, any improved doctrine or practice. The old time-honored doctrine of abandoning such cases to expectant treatment, at least so far as the maxillary bones (more especially the superior) are concerned, let us hope has had its day In every case of necrosis, there is a stage of incipiency; and the difficulty of diagnosis of this stage, as the beginning of death of a considerable territory of osseous tissue, is the chief obstacle to aborting every case.

"Let us ask what is it that dies, and why does it die? We answer, bone territory dies, and it dies because the supply of its nutrition is cut off. This is easy of proof, by injecting fresh arterial blood into freshly necrosed bone territory; and if in a single instance bone may be resuscitated, what is in the way of resuscitating it in every case where the fresh supply of pabulum may be had? The standing doctrine announced by all the past pathology of bones is this, namely, 'the periosteum is the bone producer, and the nourisher of bones.' Here, as everywhere, the ambiguity of apprehension of what constitutes the tissues, is the great stumbling-block against which we bump our pathological toes.

"It were as good sense to say that the scaffold poles on the outside of a new building are the builders of the walls of the edifice, as in the light of the present histology to assert that periosteum is the bone producer and bone nourisher.

"What is periosteum? A term coming from the dead languages, meaning around a bone. So far so good. This term had its origin before the days of Lōwinhek. But in defining tissues since his time, closer scrutiny has become the rule in the light of our present knowledge. It would be difficult to distinguish, under the microscope, fragments of the dura mater, capsule of Glisson, pericranium, peridonteum, perichondrium, perimisium, perineurium, or periosteum, one from the other, without the knowledge whence they were taken. What, then, is periosteum proper? It is simply connective tissue. What is its function? Simply limitation of organs.

"More than the periosteum must be detached from the bone to secure rapid reproduction of the part exsected.

"A continuous stratum of osteoplasts on the osseous face of the periosteum may be said to be the best bone seed. But I have reason to believe that true bone not unfrequently arises in the connective tissue, resultant upon the colloid contents of the pocket, whence parts of bone have been exsected, by independent, that is disconnected points of ossification.

"What sort of metamorphosis these points pass through, unfortunately for my views, I have not been able to demonstrate, because my patients thus far persist in retaining for their own use the reproduced structures.

"Whenever we are so fortunate as to be consulted in the first stage of necrosis, when the pain becomes located, and of that peculiar distressing character indicative of this condition, instead of obtunding the pain by the administration of narcotics, thus permitting the disease to extend to greater distance, we should in every instance boldly cut down upon the seat of the pain, cutting entirely through, not only the periosteum, stratum of osteoplasts, and external dense portion of the bone, but into the bone cells proper.

"In case the pain be entirely local, and at a single point, one transverse incision over and into the seat of the malady will be sufficient to effect the abortion of the necrosis.

"If the territory be considerable, in addition to the central incision, a series of similar incisions should be made across the line of limitation between the healthy and diseased structure, sufficiently thorough and deep to unload the capillaries, the sub-periostal cells, and bone cells, as before indicated, so as to limit the further extension of this inflammatory stage of the necrosis. These incisions should completely encircle the diseased territory.

"This treatment has never disappointed me in a single instance. If the operation is thoroughly done in accordance with these directions, supporting constitutional treatment will complete the cure, without a repetition of the incisions.

"If the necrosis has progressed so far as to have effected separation between the hard and soft parts, causing the soft parts to bulge out and become thickened by infiltration into the cellular tissues without breaking through and forming sinuses, a modification of the previous treatment should be pursued, by opening into the centre with a strong tenotomy knife, carrying the point to the margin of the separated tissues, and cutting across this line between healthy and diseased action, on at least four sides of the denuded bone. The character of the discharge that comes from this cavity will indicate the requisite treatment. If it be glairy, mixed with only moderate quantity of grumous matter of broken-down tissue, it should be thoroughly washed with warm water, with a few drops of tincture of callendula dissolved in it; then dry the chamber with soft linen or bibulous paper wound upon a flexible probe, and repeatedly introduced until it indicates that the cavity is dry, after which inject with a solution of chloride of zinc; withdraw the syringe, and press a soft fine sponge over the orifice, so as to remove all uncombined chloride, after which delicately introduce a tent into the orifice: this may be conveniently made by winding cotton or lint around a fibre of broom corn or other delicate structure, making it just large enough

to be retained in the mouth of the orifice, when introduced by a twisting motion. Cut it off level with the surface, and place a little pack of cotton, saturated with tannin and glycerin, over the surface, to complete the dressings.

"The next day, if there be no disposition for the tent to free itself, we may hope that our desire is accomplished; and even if it has slipped out of the orifice, and exposed no pus or sanies, and the coagulum formed by the zinc be not diffluent, we may still hope for good results, and should repeat the tannin and glycerin dressing without the tent, keeping close watch of the case until it issues in complete recovery, or refusal to return to a healthy state.

"If resuscitation of the osseous structure fail us by this treatment, we will then have to deal with a necrosis by careful removal of all that portion of bone deprived of circulation. This should be effected piecemeal, so as not to unnecessarily enlarge the orifice, thereby preventing the convenient formation of a pocket for the retention of the coagulum, out of which to secure the new structure. When all the diseased tissue is removed, which is indicated by the peculiar feel of the instrument passing over living bone, and also by the florid or arterial character of the blood, proceed to wash all debris away, and use the zinc as before, and dress with tannin and glycerin, without a tent.

"If the patient present with open sinuses discharging the offensive broken-down plasm by which nature attempts to repair the parts, with attacked or free portions of necrosed bone in the cavities, proceed to remove piecemeal and delicately all the fragments of necrosed bone to the limit of the diseased territory; and if the line of demarkation between living and dead parts be not well defined, proceed as before to scrape, rasp, or burr them down, until the healthy territory is invaded; cleanse, dry, inject with chloride of zinc, and apply the external dressing of tannin and glycerin on cotton. Put the patient on supporting treatment; watch with the utmost care; secure cleanliness in accordance with the foregoing directions, and you will not be disappointed in the expectation of favorable results."—(*Med. and Surg. Reporter.*)

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Chloride of Zinc Solution in the Treatment of Abscess connected with Diseased Joints.—In a paper upon this subject read before the Clinical Society of London (*Med. Times and Gaz.*), "MR. DE MORGAN insisted upon the utility of antiseptics in general, which he considered a great boon in the treatment of hospital patients. At the Middlesex there had been a remarkable diminution in the number of cases of pyæmia and of erysipelas occurring in the wards since these remedies had been generally used. The chloride of zinc seems to form a coagulum over the wound, and this is incapable of decomposition, and fluids in the wound are thus kept free from taint. After some remarks respecting the causes of putrefactive decomposition, he mentioned several cases in which abscess was treated with the chloride under the most unfavorable circumstances; their cure had been as rapid as could be the case in abscess of the same extent in the most healthy persons placed under the most favorable conditions. The cases related were taken simply because they all happened to be in the hospital at the same time."

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"*Styptic Colloid: Clinical Experiences.* By DR. JOHN LOWE, Surgeon to the West Norfolk and Lynn Hospital.—In ordinary operations

performed on healthy tissues, Nature is, as Hippocrates said, 'sufficient of herself to the cure of every evil.' She pours out a protective fluid for the closure of the wound, and prevents those untoward results which follow the production and absorption of noxious products. But in less healthy structures, or where closure of the wound is impracticable, these results are certain to follow in a greater or less degree, and it is in such cases that we need assistance in controlling the tendency to decomposition in the fluids, and thus preventing the risks from pyæmia, while at the same time fostering and protecting the delicate cell growth on which we depend for the completion of healing.

"Owing to the antiseptic principles (gallic acid and benzoin) contained in the styptic colloid, we find this indication completely fulfilled. The healthy character which the pus assumes after its use in necrosis operations contrasts wonderfully with the usual sanious and offensive secretions when other dressings are used.

"Many conservative operations depend mainly for their success on the degree of immobility which it is possible to maintain. Frequency of dressing is in these cases the *bête noire* which we most dread. With the most delicate handling, and with the surgeon's constant personal care, how difficult it is to avoid doing mischief! Without them how often failure results! But if these be no longer necessary, except in a very minor degree, the gain is great indeed. Those who have had to undergo severe operations would soon tell us the worth of a process which would diminish the number of dressings to two or three.

"But there are other cases in which we find equal advantage from the use of the 'colloid.' Burns, which are both troublesome, offensive, and painful in the dressing, are deprived of half their terrors. When profuse suppuration sets in, the 'colloid,' if painted freely over the surface, at once removes the fetor, protects the granulations, and the wound speedily heals. No doubt the first dressing is painful, but not so the others. With moderately sized wounds the first dressing is also the last. Nothing further is required but daily painting with the 'colloid.' In cancer the comfort obtained is very great. I have given a case in which the colloid was used with most perfect success, and strangely enough, with a marvelous diminution in the amount of pain."—(*Med. Times and Gaz.* and *Braithwaite's Retrospect.*)

"*Styptic Colloid.*—I have now, for more than a year, used Dr. Richardson's colloid styptic in a large number of cases of incised and lacerated wounds, some of formidable dimensions, with complete success in a large proportion of cases. In two-thirds of the cases so treated I can with confidence assert that union by the first intention has been obtained; or that the reparative process has proceeded either without suppuration, even in bad cases, or with the suppurative process reduced to a very insignificant amount. And in no instance have I seen any injurious effects."—(MR. W. ADAMS, *Ibid.*)

"*Carbolic Acid: Antiseptic Principle of Treatment in Surgery.*—The preparations of carbolic acid in use in surgery may be said to be three—carbolic oil, carbolic lotion, and carbolic paste. The composition of the first is carbolic acid and boiled linseed or other fixed oil, in the proportion of one to five; that of the second, carbolic acid and water, in the proportion of one to thirty, and that of the third, carbolic oil with

whitening, in the proportions requisite for the consistence of soft putty. The results of the employment of these preparations in surgery are almost to be called wonderful, and promise to remove and prevent an immense amount of human suffering. In a case of removal of a parotid tumor the wound was sponged with carbolic lotion, the edges stitched together with silver sutures, and a plaster of carbolic paste applied. On the third day the wound was quite healed. In a case where the knee-joint was laid open by a scythe, the wound was freely sponged out with carbolic oil, the edges brought together, and a pledget of lint soaked in the oil laid over the wound. On the fourth day the wound was perfectly healed. Cases of compound fracture, psoas, and mammary abscess are treated most successfully by the same plan, which promises to create quite a revolution in surgery."—(PROF. SYME, *Ibid.*)

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"*Carbolic Acid: Poisoning by External Application of.*—Care must be taken in the external application of carbolic acid over large surfaces, as three cases of poisoning by it have occurred in the workhouse of Aston Union, near Birmingham. It was applied in a wholesale manner, in mistake for sulphur lotion for the cure of itch. Two of the cases proved fatal."—MR. E S. MACHIN, *Brit. Med. Jour.* and *Ibid.*)

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"*Iodoform.*—This substance, in powder, has recently been applied, in Paris, with great success, to the surface of obstinate ulcers. It rapidly causes them to heal. The *Journal of Applied Chemistry* remarks of it: 'In addition to the virtues which it possesses in common with iodine, it is very useful as an anodyne, and especially in neuralgic affections. In many local diseases it is employed with good success. It possesses anæsthetic properties when volatilized and inhaled, though to a degree inferior to chloroform or ether. On the score of economy it is fully equal to iodine or any other of its compounds, and far preferable to most of them, on account of being a non-irritant, and becoming more readily absorbed and assimilated in the system. We trust that its use will become more extensive, and would urge physicians to test its qualities more thoroughly.' "—(*Med. and Surg. Reporter.*)

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"*Aphonia of nearly Two Years' Duration cured by Electrical Stimulation of the Inferior Laryngeal Nerve.* By DR PHILIPPEAUX. (Revue de Thérap. Médico-Chirurgicale, and Edinburgh Medical Journal, January.)—Various methods of treatment had been unsuccessfully tried in a case of aphonia which had originated two years previously, and which was supposed to be due to paralysis of the nerves of the vocal cord. The patient was a healthy female, twenty years of age. It was ultimately decided by Dr. Philippeaux to try the effect of electrical stimulation, applied in such a way as to directly influence the inferior laryngeal nerves. For this purpose, one metallic pole was inserted into the lower and posterior portion of the pharynx, and the second was placed on the skin over the crico-thyroid muscles. A current of considerable strength was passed between these two points: almost immediately after the closure of this current the patient started, uttered a loud cry, and began to speak with a facility equal to that which she had possessed before the commencement of the aphonia. Dr. Philippeaux remarks that he has frequently met with success in treating aphonia by

electricity, but never before had he the good fortune to obtain so instantaneous and perfect a cure."—(*Half-Yearly Abstract of Med. Sci.*)

"*Tumors: Treatment by Electrolysis.* By DR. J. ALTHAUS.—The electrolytic treatment of tumors, which is now upon its trial, acts in a threefold manner, viz.: first, through mechanical disintegration of the tissues by the nascent hydrogen; second, through chemical destruction by free alkalies, potash, soda, and lime, which are evolved at the negative pole of the battery; and lastly, through a modification of nutrition. The positive pole is never to be introduced into the tumor operated upon, but always placed on the adjacent skin, while the negative pole, which should terminate in a needle or number of needles, is introduced into the interior of the tumor. The action of the electricity is thus upon the internal parts of the tumor, and all the risk of surgical operations is done away with. When the tumor is large the current should be passed through it from fifteen to thirty minutes at a time, and repeated every day. For smaller tumors a less time will suffice. The results so far have been very encouraging. Nævus, bronchocele, and other innocent tumors have been destroyed, or rather wasted, with success. The results in the treatment of malignant disease are of course not so satisfactory, but more experience is still required on this point. A battery suitable for the purpose may be obtained from Weiss, weighing 36 pounds, in a neat case, and only requiring a little attention every three or four months.

"Dr. Althaus has now treated fifty-two non-malignant and eleven malignant tumors by electrolysis. He finds bronchocele, nævus, and the allied forms of tumor more favorable for this treatment than lipoma, enchondroma, and osseous tumors. Nævus is very successfully treated in this way, and in cases where the situation, size, or state of health of the patient counterindicate other plans of operation, this is especially called for. A case of bronchocele of large size, which many surgeons of eminence had pronounced incurable, is shrinking fast under the influence of the electrolytic treatment. The result of this treatment in cancer is not favorable.

"Dr. M. H. Collis, of Dublin, does not use electricity for a short time daily, as recommended by Dr Althaus, for the purpose of destroying tumors, but for lengthened periods. He employs a weak current, generated by batteries made of small cylinders or plates of wood covered with felt, and wrapped round with zinc and copper wire. These may be excited by salt and water, and carried about with the patient, tied up in gutta-percha or oiled silk. The tumor should be covered with a plate of zinc or copper, which must be connected with the positive pole of the battery, while the negative pole is placed on the skin in some other part of the body."—(*Braithwaite's Retrospect.*)

"*Excision of the Inferior Dental Nerve, on account of Intractable Neuralgia.* Reported by S. W. GROSS, M.D., of Philadelphia. (American Journal of the Medical Sciences, January.)—Dr. Gross places on record four examples of neuralgia from morbid changes in the inferior dental division of the third branch of the trifacial nerve, which occurred in the practice of Professor S. D. Gross. All known remedies for the relief of the disease had been employed without avail; and the operation of trephining the lower jaw-bone, and exsecting as much as possi-

ble of the trunk of the nerve, was instituted as a final resort. Entire immunity from pain resulted in every instance."—(*Half-Yearly Abst.*)

"*Neuralgia of the Tongue, cured by Excision of a Portion of the Lingual Nerve.* By Dr. Vanzetti, of Padua. (Gazette des Hôpitaux, and Edinburgh Medical Journal.)—P. M., æt. sixty-four, mother of twelve children, complained, in January, 1866, of intense pain in the left half of the tongue. It was thickened, and there was in it a peculiar pricking feeling, while the slightest movement in eating, drinking, or speaking caused intolerable agony. The use of morphia and hypodermic injections during a month did no good. The patient could never sleep for an instant, and dared not eat on account of the intolerable agony. Opium, iodide of potassium, arsenic, ice, acupressure, local anæsthesia by ether, electricity, etc., were all tried without success. Remembering that on a previous occasion the patient had been cured of a severe pain in her tongue and lower jaw by an incision along the side of the tongue, Dr. Vanzetti made one along the whole left side of the tongue. This gave considerable relief for a fortnight, at the end of which time the pain returned with redoubled vigor, and over a larger area, now being felt inside of jaw, ear, and side of neck. She pressed for more decisive treatment, and it was determined to excise a portion of the lingual nerve. This was done. The tongue was pulled well forward, and an incision was made between the gum and tongue from the last molar forward. By a careful dissection, the nerve was exposed as far back as the edge of the internal pterygoid muscle, and nearly an inch of it was removed. The pain ceased from that moment; and when last the patient was heard of, sixteen months after the operation, the pain had not returned. She was at that date unable to distinguish the taste of quassia from that of sugar on the left side of the tongue, and the common sensibility of the part was much diminished. M. Vanzetti refers to the researches of Messrs. Hilton and Moore on this subject."—(*Ibid.*)

"*Cicatricial Contraction of the Jaws. Operative Treatment.* By Professor G. Jäsche, of Nischni-Novgorod. (Langenbeck's Archiv.; Schmidt's Jahrbücher.)—The subject of this contribution was a peasant girl whose jaws, in consequence of destruction of part of the right cheek and the gums on the right side from gunshot wound, were held in close contact by a cicatricial band extending from the angle of the mouth to the masseter muscle. Dr. Jäsche incised the right cheek from the angle of the mouth to the front of the masseter, and removed the cicatrix; the jaws were then separated by means of a lever, and, together with the edges of the wound, were kept apart during investigation by an apparatus formed of two iron arches of a horseshoe shape, and furnished with flattened grooves for the reception of the teeth. The ends of these arches were connected by hinges, and at their centres worked a screw, with which they could be separated. After cicatrization, two incisions were made, each one being about 4‴ from each edge of the cleft in the cheek, and carried through skin and cellular tissue until they met over the masseter muscle at its anterior border; the skin was then dissected and loosened toward the eye at the lower edge of the inferior maxilla, and brought together by suture, so as to cover the deficiency in the cheek. The movements of mastication were subsequently performed in

order to counteract the cicatricial contraction of the raw inner surface of the newly-formed cheek. The result of this treatment was very successful. Dr. Jäsche prefers this method for cases of immobility of the jaws not dependent upon anchylosis of the joint, to division and resection of the inferior maxilla, proposed by Esmarch and Ruzzoli."—(*Ibid.*)

"*Blue Line in Saturnine Affections, and its Pathognomonic Value.* (Archives de Médecine Navale, and Gazette Hebdomadaire.)—Dr. FALOT refutes the authors who believe that the blue line along the gums is formed by an accidental deposit on the buccal mucous membrane of lead furnished by dust contained in the air or food, or still more in fluids that have been adulterated or accidentally charged. According to M. Grisolle among others, the blue line is the livery of the lead-worker, not a symptom of poisoning, but a simple deposit, and a sign of the worker's occupation. M. Falot quotes the observations of Beau, Barlow, Gregory Smith, and Lecoq, all of whom observed the blue line in patients undergoing an internal treatment with pills of subcarbonate or acetate of lead; and he gives in addition the reports of some cases of his own, which were gathered in an epidemic of colic in a ship's crew at the Gaboon, the cause of which was lead-poisoning. Finally, after having established by experiment the impossibility of reproducing the blue line artificially, by touching the gums corresponding to the incisor and canine teeth of the lower jaw with a brush dipped in acetate of lead, and after having proved that oxygenated water and water sharpened by sulphuric acid, the ordinary reagents of lead, had no influence upon the blue line when it is plainly established. Dr. Falot proves that the line is the result of an elimination of the lead, and indicates by its manifestation that the lead, carried along by the circulation, comes to be deposited in the tissue of the gums, where it forms a combination which reveals its presence by a more or less intense blue coloration. M. Falot finishes his contribution by representing the blue line as a sign of the penetration of lead into the economy, and he derives the important conclusion for forensic medicine, that its presence may denote lead-poisoning, although an analysis of the viscera may not have revealed the smallest trace of the metal."—(*Ibid.*)

Goitre and Cretinism.—According to SAINT-LAGER (*Brit. and For. Med.-Chir. Rev.*), "dental caries, albinism, stammering, and deafness, are unusually common in those suffering from goitre or cretinism, and in the countries where these are endemic; where the proportion of deaf and dumb people is also greater than elsewhere. These disorders seem, therefore, to be symptoms of what our author calls 'cretinous diathesis,' modified by circumstances of which we at present know nothing. The conditions, whatever they may be, which produce goitre in man, affect the lower animals in the same manner. Thus, dogs, cats, pigs, sheep, horses, mules, oxen, have all been observed to have bronchocele—the wool or hair at the same time becoming rough, the voice hoarse, the hearing obtuse; the animal falls at last into a state of torpor, and dogs have even been noticed in a state of true cretinism."

"*Inoculation of Cancerous Matter.*—It would appear from the experiments of M. GAUJON, mentioned in the *Gazette Hebdomadaire*, that he

succeeded in causing not only the appearance of a cancerous tubercle on the skin of a guinea-pig inoculated with the matter of epithelioma, but also an eruption of the same morbid manifestation on the mucous surface of the intestinal canal."—(*Lancet.*)

Pyæmia Poison.—"Dr. Richardson has separated the poison of pyæmia; it may, he says, be evaporated to the form of syrup or extract. It produces, when dried, a substance closely resembling the snake poison. It admits of being pulverized, and when it is introduced into the wound of a healthy animal produces precisely the same symptoms as those of the patient from which the poison was taken."—(*Braithwaite's Retrospect.*)

"*Snake Poison.*—Mr. Charles J. Smith, late Inspector General of Hospitals, Madras Army, after making many experiments on dogs, and witnessing the effect of the antidote he recommends in the case of snake-bite in a man, considers that in the liquor ammoniæ diluted just sufficiently to enable the patient to swallow it, we possess an efficient remedy. A tourniquet ought to be placed upon the limb bitten, artificial respiration kept up if necessary, and the liquor ammoniæ freely administered. It is curious that neither prussic acid, opium, nor arsenic are poisonous to snakes, while tobacco is so fatal to them that a pinch of snuff is sufficient to poison them."—(*Brit. Med. Journ.* and *Ibid.*)

"*Iced Tea.*—The most delicious and sustaining beverage that can be drunk this weather is good strong tea cooled down with lumps of ice. It should be only slightly sweetened, without milk, and flavored with a few slices of lemon, which are infused at the time the tea is first made. A jug of this ready at hand would suit the complaint of many of our readers to a T while the thermometer remains where it is and has been of late."—(*Med. Times and Gazette.*)

"*Cements for the Chemist.* By DR. ADOLPH OTT, of N. Y.—In addition to the recipe which has lately been furnished to the public by Dr. Toller, I would beg leave to add the three following ones, which are, like the former, based on the action of the chloride of zinc on the basic oxide of the same metal. The same results are well known in the formation of oxychloride of zinc, or basic hydrochlorate of zinc-oxide, and first brought into practical use by M. Sorel, of Paris:

"1st. Take of soapstone, 10 parts; sand, 30 parts: asbestos, 5 parts; oxide of iron, 5 parts; oxide of zinc, 50 parts; mix.

"2d. Soapstone, 10 parts; sand, 30 parts; hydraulic cement, 5 parts; oxide of manganese, 5 parts; oxide of zinc, 50 parts; mix.

"3d. Soapstone, 5 parts; sand, 35 parts; calcined magnesia, 10 parts; asbestos, 5 parts; oxide of iron, 5 parts; oxide of zinc, 40 parts; mix.

"The materials for the above compositions should be intimately mixed together, after having first been finely ground. When applied, the metaliferous mixture is made into a pasty mass with a solution of chloride of zinc of 25° to 35° Baume. Too quick setting is prevented either by the addition of one or two per cent. of linseed meal, or a little ale or beer. Though the above formulæ may be considered as mere exam-

ples, still it would not be advisable to change the proportions of the ingredients to any great extent. Each one is intended to serve a definite purpose; the soapstone, for instance, is designed to impart the requisite degree of plasticity; the asbestos to promote the aggregating; and the iron to render the composition harder. By introducing leather, reduced to a fine pulp, and woolen or cotton shearings, into the above-named compositions, I obtained some materials of the consistency of stone, which possessed a comparatively small specific gravity, and very elastic properties. Soft or friable substances, like chalk or ochre, do not answer the purpose as an ingredient. The basic oxychlorides of zinc are but sparingly soluble in water, but more abundantly soluble in the aqueous chloride of zinc, and very easily in acids and the caustic alkalies."—(*Journal of Applied Chemistry.*)

"*Water-proof Glue* may be made by boiling one pound of common glue in two quarts of skimmed milk. This makes an excellent glue for articles which are exposed to the action of the weather."—(*Ibid.*)

"*Bogus Gold Dust.*—Mr. H. M. RAYNOR, manufacturer and dealer in platinum, New York, has kindly submitted to us a specimen of counterfeit gold dust, made from grains of platinum, coated with gold or bronze. He has taken from Mr. H. G. Torrey (son of the Chief Assayer) at the United States office, Wall Street, some 500 ounces within four months. For a year and a half past, small parcels have occasionally been offered for coinage at the office, and been examined and their character detected by the experienced assistant, Mr. Charles Graham. The grains are small and flattish, an excellent imitation, seeming to be made by crushing or stamping the cuttings or scrap platinum under heavy mill-power. It is alloyed with copper and a small amount of silver. The coating, when gold is not at once removed by aqua regia, requiring to be boiled for an hour or more. The analysis by Dr. John Torrey, gives 60 to 65 per cent. platinum. A banker in Kansas City was recently victimized to the amount of $6000 (gold) for a lot of 300 ounces, which as platinum was not worth over eight or nine hundred dollars (gold). It is surmised that this counterfeit finds its way into this country from France, *via* Mexican ports. Its appearance being so perfect as to deceive experts, the greatest care will be necessary to avoid imposition."—(*Sci. Amer.*)

Old Files Utilized.—WM. TROWBRIDGE, of New Orleans, writes to the *Sci. Amer.*: "I am a machinist, but I do mostly brass work; a great many of my tools I make out of old files. My mode of working is as follows: The files must be first annealed from end to end, then they are heated to a very low red heat, then hammered briskly; this flattens the teeth to a thin scale, which each successive heating will cause to peel off. This must be repeated until the file marks are obliterated, when the file can be worked like ordinary steel. By this method I am able to make thin springs from old files, and I venture to say you will hardly find a flaw. To grind an old file on the grindstone takes considerable time, especially a small file, and to set apprentices to that work is doing them injustice, for it is certainly teaching them how to work and yet be idle."

THE

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ORIGINAL COMMUNICATIONS.

CALCIFICATION OF THE DENTAL PULP.

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A VERY valuable specimen was forwarded recently to the Philadelphia Dental College by Dr. C. B. Rising, of West Rockford, Illinois, illustrative of that interesting but painful affection known as calcification of the pulp, in which the pulp cavity is either occupied by a number of nodules, or almost obliterated by the formation of a structure which, under the microscope, presents a peculiar appearance named secondary dentine.

The pain attendant upon this change of structure is frequently of the most excruciating character, analogous to tic douloureux in its most aggravated forms, and, in some instances, is the seat of the painful sensation attributed to pressure upon the main branches of the trigeminus.

Occurring, as this change of structure frequently does, in teeth which, to all appearance, are entirely free from disease, not having the slightest particle of decay or imperfection of any kind about them, one who has had no experience with such cases is apt to refer the painful sensation experienced (located by the patient in the tooth) to sympathetic irritation, arising from an adjoining tooth, or some more distant organ. But the persistent, boring character of the pain, which is unchangeable, located in one spot, leaves no doubt of its character to those who have, by personal experience, felt or treated it. At first the pain is confined to irritation of the pulp, without any external involvements, but, in due course of time, periodontal irritation arises, and periodontitis becomes developed. This may proceed to true inflammation and formation of an alveolar abscess, or it may stop short of active congestion, and, *resolution* supervening, no further trouble may be experienced by the patient in that tooth for years, if ever. Such

cases, however, are the exception, for, in the vast majority of instances, extraction, sooner or later, is the only alternative through which relief can be obtained if the painful sensations continue.

About ten years ago, the first case that came under my observation and care was a left upper canine in the mouth of Prof. J. Foster Flagg. The tooth had been giving him pain for several days, and, on examination, the pulp was found exposed; the arsenical paste was applied and the pulp removed, and a number of small nodules found in it. The tooth was subsequently filled, but the pain returning, the filling was taken out, and some time after the tooth was extracted, with the hope of obtaining relief from the pain, which had assumed the most aggravated character. This gentleman had a number of teeth removed on account of severe pain located in them, which, so far as external appearance was concerned, were entirely free from blemish. But, on breaking them open after extraction, the pulp cavities were invariably occupied by nodules.

My own experience in this direction has been somewhat more fortunate than my friend's, not only on account of the modified character of the pain, but also in the ultimate subsidence of the unpleasant sensations.

About ten months back, the right superior central incisor, which is entirely free from decay, became exceedingly uncomfortable, on account of a dull, boring pain, which continued for some weeks, the contact of cold or hot water aggravating the symptoms. Eventually the tooth became very sensitive to the touch, and I was on the eve of having it drilled into, when the symptoms abated, possibly to a certain extent owing to the application of tincture of aconite and tincture of iodine to the gum. The tooth, however, remained so tender to the touch for some months that very great care was exercised not to bring anything in contact with it. All unnatural sensation, however, passed away three or four months since, and the tooth is now as useful as ever, and without having undergone any change in color.

Within the past month a similar but shorter experience has been passed through with the right superior second molar. In each of these instances, I am satisfied, by my sensation and the general experience of the cases, that calcification of the pulps had taken place. An examination of the interior of the pulp cavities, of course, would demonstrate beyond a question of doubt whether my opinion is correct or not, but so long as the teeth prove as comfortable and useful as they now are, I do not propose to have such investigation instituted.

The specimen of calcification referred to in the opening of this communication was found on breaking open a right inferior dens sapientiæ after extraction. The tooth had been a very great source of annoyance to the patient on account of continued uneasiness, which eventually

assumed an intolerably painful character on the establishment of periodontitis, which passed on to suppuration, when the tooth was removed.

At a meeting of the Biological and Microscopical department of the Academy of Natural Sciences, held during the month of July, I exhibited some microscopical sections of incisors, in which calcification of the pulp had taken place, and directed attention to the fact that in those specimens the cementum was unusually abundant, and suggested that it was more than probable that, on examination, the majority of teeth with exostosed fangs would reveal either the presence of nodules in the pulp cavity, or the almost entire obliteration of the cavity, as the same operation of the economy which formed the one produced the other.

ARTISTIC OR EXPRESSIONAL DENTISTRY.

BY J. T. CODMAN, BOSTON, MASS.

Read before the Massachusetts Dental Society.

The term "expressional," applied to dentistry, is new; yet I have found no name which better serves my idea of what is intended to be conveyed by it, viz., the preservation of the expression of the features after the loss of teeth, or the restoration of the normal expression or a better one on the insertion of artificial teeth.

That the *general* mode of inserting substitutes for the natural teeth does not restore or preserve the best expression of the faces of our patients, scarcely admits of an argument. That there are dentists who make an exception to this rule is happily true, and that great general progress has been made in the past ten years toward that desirable end is also true; but that better results are attainable is certain. Doubtless, if dentists understood more of the philosophy of expression, they could attain pleasant results where they have made many failures.

That the extracted teeth are, to a considerable extent, safe guides for the form, color, size, and shape of the new set is true; yet many cases present themselves where the arch has been overcrowded, and where the insertion of a full artificial set would be impossible without distending the lips and making a bad expression. In such cases it were better to omit some of the teeth, lessening the number, and insert teeth of nearly the natural size.

Among the prominent failures in the expression of the sets of the present day is that of,—1st. Color—by which they are often detected at once. 2d. Length—being often too long, and sometimes too short. 3d. Size of the teeth—often too large, and often, of late, too small. 4th. Deficiency of form of each individual tooth, or what is called "want of character," from lack of curved lines. 5th. Want of promi-

nence and length of the eye teeth. 6th. Too great length of the back teeth, especially in upper sets. 7th. Too much evenness or similarity. 8th. The size of the arch—often too large or too broad, sometimes very much so. 9th. The horizontal line, or line of occlusion, is too straight, often looking as though both sets were made together on one piece and cut apart with a knife.

Turning from this dismal page of failures, let us give a momentary glance at the expression of character as shown in the teeth and physiognomy of animals in connection with man; for being all revelations of one power and parts of one system, they must all bear some analogy to each other.

How often we all have enjoyed the pictures of animals dressed as human beings, exclaiming "Capital!" at these burlesques on humanity But it is not the picture that burlesques—the animals themselves do.

That the physiognomy of the lower animals and that of man bears the same imprint may be brought to mind by the fox with his sharp-pointed teeth, his narrow dental arch, neatly covered with his trim, delicate lips. Observe how meek and quiet he looks, with his twinkling eyes half shut and his nose over his paws. Now arouse him with a rod, and how his whole expression changes; his second nature—his savage side—is uppermost, and his teeth have a most offensive look.

Then look at one of the rodents, as the rat, with his narrow, displayed incisors, with their mean, contemptible look. He is the fellow that sneaks around at night, makes holes in your mopboards and gnaws your lead-pipes, and occupies your drains. There is expression in his teeth, but to me it is of an ungenerous sort.

In contrast to these, look at the incisors of the horse, and one can hardly look at the skeleton in the Natural History Society rooms without feeling that he is grinning at you. Observe the teeth of this animal, for they are worthy of a great deal of study. It almost seems that this was the pattern that dentists took for making teeth. Observe the centrals, how broad and flat they are; how unobtrusive the eye teeth, or canines, if you like the term better. Observe the horizontal line of occlusion, and the broad, regular arch. Do we see malice in this expression? Do we not see a broad, generous nature, perhaps a little coarse, but highly amiable? Who has not heard of a *horse-laugh*—that condition of laughter when the head is thrown back, and from central to molar all the teeth are shown in the plenitude of their ivory lustre!

But my limits forbid following this train of thought further.

You will say, What has all this to do with the expression of artificial teeth? Have a moment's patience and you may see.

Observe all these animals, and let me ask you if any one of them looked as though it had in a set of artificial teeth, and you will say that the harmony of their color and the complexion and the perfect adaptation will answer that question.

Our artificial teeth should have this same harmony, and I announce that no artificial teeth *can be perfect* without harmony of color between them and the complexion.

In short, if the color is too light, they make the complexion appear ghastly; if too dark, they apparently darken the complexion.

All the faults I have named have much to do with the expression. If the teeth are too long, the mouth is opened too wide and the lips are drawn down to cover them, thus thinning the lips, giving a close-mouthed look, except when the person laughs or talks, and then there is too much display of dentistry. If the teeth are too short, the lips are drawn up and thickened, giving a shrewish expression, and making it appear at times as though the person had no teeth. If the arch is too large, it takes up the lips and cheek, giving also an undue prominence to the lips, making a sensual or babbling expression, varying according to the size of the arch. Want of prominence of the eye teeth allows the corners of the upper lips to fall down, making a mournful expression. If the eye teeth are too long, and prominent or sharp, we have a savage expression. But leaving many of the criticised points, I desire to speak of size and style in giving characteristic effect.

A fine, brave, generous boy said to me a few days since, "Are not my teeth larger than usual?" "They are!" said I. I could have told him so with my eyes shut, for he had a winning, open, frank, generous manner that was not consistent with small teeth. Since then I have worked for a lad some years older, with remarkably pointed eye teeth and bicuspids, but I have no insight into his character, although he was the son of an old friend; his secretive disposition made him reserved in expression.

Show me, if you can, a person with irregular teeth, and not show me one who is undeveloped at some grand point of character; irregularity being, I contend, mostly want of development.

Take from your specimens any central tooth, and you may judge, to a certain degree, the character of the former owner. The delicate-formed slender teeth you will not call the teeth of a giant but of a delicate woman. Those sound, plump-looking teeth are a man's. Those short, yellow, small teeth are usually set in a prominent alveolar ridge and large arch; I will testify that the owner came from a long-lived family and is a great worker.

From these and similar indications the dentist must build up his science of expression. As I have said, the natural teeth are a prominent and the best guide a dentist can have; but if these are lost beyond recovery, judgment and the eye of an artist is necessary to give or restore the normal expression.

What, then, shall the dentist do when the patient comes to him without teeth, desiring artificial ones? First, look at the patient. If the

skin is light, the teeth must be in harmony. If the features are large, the teeth must be large also. If thin, and narrow, and delicate, the teeth must be so also. If nervous and long-limbed, indicated by long, thin hands and feet, the teeth should be long in proportion to the width; and if, with plenty of money in his pocket, he quibbles by the hour for the lowest price, put in a set of narrow teeth, and he will be perfectly satisfied, as it will suit his character perfectly.

If your generous-hearted, full-souled friend desires teeth, and you place some small, narrow teeth in his mouth, it would be like putting teeth like those of a rat in the mouth of a horse or cow; and if in the mouth of your sharp, versatile friend you place a set of teeth whose horizontal line shall be straight, and whose eye teeth shall be deficient in prominence, it would be like placing the teeth of a horse in the mouth of a fox or dog. And if in the mouth of your mean, sniveling person you place a generous and wide set of centrals and laterals, you give him a character better than he deserves.

I have thus sketched the outline of a very important subject of observation and study. I hope others may be able to fill up the sketch, as I have no doubt they are able to do to a certain extent, and yet there will be room for more study and more observation. If you say that some of these ideas are new I shall be pleased, for we are associated together for the purpose of bringing forth the new and the untried, that we may try them in the light of reason and experience. You have your thoughts on this subject, and other subjects that interest us: please speak them —please write them. I have believed what could be said could be written. The dread of the pen vanishes with familiarity. Volunteer an essay as one of the means of improvement—that assists in concentrating the mind, which is the secret of power.

In a word, give *expression* to your mind. As the features of the face improve by dwelling on pleasant thoughts, so will the features of the mind; and when the Great Artist shall chisel away the rough human marble that surrounds the soul, I hope to see, in "the new dwelling-place," old friends with ennobled expression, won from the triumphs over material sorrows and wrung from the truest successes in this life.

DENTISTRY AND THE MATERIA MEDICA.

BY C. S. WEEKS, NEW YORK.

In the June number of the Dental Cosmos, vol. x. page 294, is an article entitled "Materia Medica," by Dr. Whitney, of Buffalo, N. Y., criticising my irreverence toward old authorities and great "scientific minds," inasmuch as in an essay published in the February number of the Dental Cosmos, entitled "Causes of the Decay of Teeth," I said let

dental students study the Materia Medica merely as a record of the gropings and stumblings of the scientific mind amid the ruins and rubbish of old superstition.

Perhaps the word chiefly, instead of merely, would have conveyed my idea to his mind more accurately, though the latter word is the more proper one when speaking of that system as a whole, notwithstanding that all the old systems of superstition, this included, contain germs and fragments of truth sufficient to repay the laborer for gleaning their fields, if time admits, after his main crops are harvested. In rejecting any system of error as a whole, I would not throw away any truth connected with it.

In Dr. Whitney's criticism upon my essay occurs the following passage: "If we no longer call ours a profession; if it is no longer the 'art and science of dentistry,' but merely a 'trade;' if the dentist is only a 'mechanic,' and the office only a 'shop,' why then the thrust at Materia Medica may be tolerated so far as dentistry is concerned," etc. Also, he asks, alluding to a sentence in it, "How is the student in dentistry to 'learn the principles of our profession?' simply by 'the laws of organic existence?'"

If the doctor will look a little more closely at my article, he will observe that the part to which he objects is not a thrust at *remedial science*, but at the *errors* fastened upon it by the supposed sanction which great names give to great absurdities. Chief among these are the notions that crude inorganic matter, disorganizing materials, or gross poison vegetable substance can assist vital action or cure general disease; or that the supreme Lawgiver has anywhere provided specifics which can release us from the consequences of violating his laws.

"If dentistry is merely a 'trade,' etc." (without science); "if the dentist is only a 'mechanic' and the office only a 'shop,'" then a "thrust" at the errors connected with remedial science *should not* "be tolerated so far as dentistry is concerned," but rather, dentists should passively accept the teachings of those *who have* the scientific knowledge which *they lack*. But if ours *is* a scientific profession—based on and dealing with the very commencement of the foundation principles of physiological action—nutrition—then it is our duty to learn the truth at first hand from nature, the infallible teacher, using others' intelligence and experience only as aids and warnings. We should, from our own stand-point, examine and criticise the claims of all theories and practices pertaining to life and health, and, while accepting and applying any truths they may contain, should reject the errors—thus helping to develop and perfect true science. We should open *our own* eyes to the light, rather than blindly follow others' gropings and stumblings through the deviating and obstructed by-paths which semi-scientific men with great names strayed into before the day-star of real science had risen far enough above the horizon to show the true road.

Then we shall see that the laws of organic existence include all the principles of physiological action, and the relations of all substances to the life-developing process—in other words, which are food for the body, building material to nourish it, hence remedial agents to invigorate and restore feeble or wasted parts, and help them to throw off obstructions. Then we shall see that these laws and the principles of our profession are one and the same; and that our profession is *not only* more than a "trade," but *also* more than a mere branch of a rude Esculapian system of "medicine and surgery." That it is rather the main stalk of the real natural remedial science which is growing up out of the decomposing *dêbris* of old systems of error; and which, though immature, and twisted and bent by the weighty obstructions, still embodies the great central and vitally important truth that nutrition is the only supporter of healthful physiological action; and teaches us to commence our labors by securing healthy conditions in the organs which are to begin the work, and to give nourishing materials, and not poisons, for its continuance.

For any one who supposes that the Materia Medica as a system has a demonstrable scientific basis, or any definite certainty as to the relation of its substances to the living organism—that it is anything more than a collection of superficially and partially observed facts, arbitrarily strung together upon superstitious fancies, with its many ends and edges all floating loose in cross-current of speculation—it will be sufficient to read the definition of Materia Medica given in *Dunglison's Medical Dictionary*, together with his confessions given with that definition as to the groundlessness of its claims to be acknowledged as a part of real science. It is as follows: "Materia Medica—the division of *medical science* which treats of the knowledge of medicines; their action on the animal economy, and mode of administration. The study of the Materia Medica is one of great importance; it is the study of the tools with which the practitioner has to work in the cure of disease. Much labor has been spent in *contriving* classifications of the Materia Medica. Some have arranged the articles according to their natural resemblances: others according to their real or *presumed* virtues: others according to their active constituent principles. The Pharmacopœias place them alphabetically. *Perhaps* the best classification would be one founded on the agency exerted by the articles on the different tissues; but this arrangement in the present state of science is by no means easy; and, moreover, *ideas* in regard to the action of medicines are so associated with certain *terms*, as narcotics, tonics, sedatives, etc., employed to denote certain operations which they are *esteemed capable* of producing, that, to abandon them would be to throw obstacles in the way of the student, without the ultimate advantage accruing to him of possessing a better knowledge of the *modus operandi* of medicines than when a classification, *somewhat resembling* those usually embraced, is adopted."

After presenting his own classification, as given in his General Therapeutics and Materia Medica, the author proceeds in the following words: "Of old the Materia Medica consisted of more articles than at present. The tendency, indeed, is, *and must be*, to diminish it *still further;* to get rid of those articles which possess no advantages over those equally common, or *whose properties are doubtful.* In a dictionary it becomes necessary to insert all that have been *reputed* to possess virtues; but the *majority* are unnecessary. The catalogue might be *largely* reduced with impunity."*

DENTAL PULP: ITS CAPILLARIES, THEIR DISEASES, ACCIDENTS, AND TREATMENT.

BY J. BROCKWAY, ALBANY, N. Y.

"DENTAL pulps are the proper organs of development and nourishment of the teeth, and should, therefore, be well understood and sedulously observed."

I quote this sentence from an article in the June number of the DENTAL COSMOS, by Dr. W. H. Atkinson. It contains the substance of an article covering six pages. This sentence contains more of the simplicity of scientific statement than any other in the communication, but even this is not quite clear.

He says the pulp is the "*proper organ.*" Is there then an *improper* organ? "The *proper* organ of development." Development is to lay open to view; does the pulp do this? But allowing the doctor—not his choice, for he is not apt to discriminate—the use of all the words in the dictionary, and all he can coin, I prefer simplicity and plainness; I would rather say the pulp is both mother and nurse to the tooth. It is the laboratory which prepares and arranges the matter of the tooth, and upon the life and healthy action of the organism of the pulp, *very much*, though not altogether, depends the life and health of the tooth; the tooth is partially nourished through its periosteum. The teeth of several animals, as well as man, in old age, have no pulp, and are still healthy and useful.

I propose to state some facts and experiences with dental pulp and capillaries, in terms easy to be understood. My practice was uniform; when exposed, whatever remained of the pulp and capillaries was almost instantly removed, to the end of the root, with a very small spring-tempered, tapering steel instrument, rapidly turned by the fingers; and this followed by a larger, and another still larger, until the natural nerve canal was made round and perfectly clear of all the internal

* The words, "modus operandi," were italicised by the author, the others by myself.

organism. I then fitted a plug of red cedar, and filled the root two-thirds its length; after securing a gold pivot to an artificial crown, and giving it the shape of a cut-nail, I pierced the cedar plug, and with a light hammer drove the tooth firmly to its base. Many of these teeth have remained firm for more than thirty years, witnessing to both the healthy condition of the root, and the utility and durability of the artificial crown. Forty years ago I inserted crowns upon two central incisor roots for Philip Dorlon, Esq., of Troy, N. Y., which, without pain, soreness, or repair, remain to this day. Upon this experience I base my first proposition. Teeth, or their roots, may long survive the loss of their pulp.

1st. The surgical removal of the internal organism of a tooth does not greatly impair the utility and durability of a tooth. From 1824 to 1834 I removed healthy pulps, with all their tissues and capillaries, not less than five hundred a year; in all, five thousand, chiefly for the purpose of engrafting artificial crowns with gold pivots; and in these cases, of healthy roots, not a single case of ulceration or appreciable inflammation occurred, the root being nourished by and through the investing membrane.

2d. The vitality of the pulp being destroyed by fracture at the point of the root, or exposure of the pulp itself by caries, or otherwise, if allowed to remain and putrefy, is likely to communicate disease to the lining membrane of the socket and periosteum of the root; inflammation, severe pain, and suppuration are the common results if timely extirpation be neglected. In all cases, so soon as a pulp is known to be diseased, past cure, or already dead, its partial remains should be entirely removed, and never be permitted to diffuse the poison to vital parts. A tooth, sore and sensitive to a rap, may be regarded as dead.

In the first decade of years of my practice I engrafted upon *dead and diseased* roots about the same number of artificial crowns as upon live and healthy roots, an aggregate of about five thousand. About one-half of these previously or subsequently ulcerated. In most cases where the putrescent pulp had no chance to escape, they had previously ulcerated, and in a large portion of those where the pulp cavity had been partially ventilated, inflammation and ulceration would immediately follow the operation. There were two causes operating to produce this: first, the live parts at the point of the roots were already inoculated, and the dead and dry capillaries being disturbed, inflammation followed. I have since learned that for this class of cases it is better to put in a pledget of cotton saturated with creasote, and touched to a little arsenic and morphine; let it remain for a day or two, or until all indications of inflammation subside, before inserting the crown, being very careful to remove all remains of diseased or putrescent matter. To prevent or cure an ulcerating tooth or root, the essential of the remedy, thorough

ventilation, is the same; sometimes ulceration may be prevented by ice or other cold application, or the result may be hastened by the application of the steam of vinegar to the point of the root. But where an abscess exists, or pus is habitually discharging, the root should first be cleaned, and then the socket should be punctured and opened, the size of a common knitting-pin, and kept open until a cure is effected, with or without other treatment. To keep the passage open, it is always well to insert a little pledget of cotton saturated with creasote.

This may need to be several times repeated if the case be obstinate, but such ulcers are always easy of cure. If the capillaries of the pulp be fractured at the point of a sound tooth, a hole should be immediately drilled from the under side into the chamber of the pulp, and its whole substance thoroughly removed and the cavity then filled. So, too, in case of an exposed, diseased pulp, if beyond reasonable hope of cure, it should first be treated with an application of arsenic, morphine, and creasote, and then, in about twenty-four hours, every particle of the disorganized pulp should be removed and the cavity filled. Or, for greater security, after the nerve canal is thoroughly cleansed, the arsenic treatment may be repeated, and the cavity made air-tight by a filling of plaster, gutta-percha, or other substance that can be readily removed, and this may remain until all symptoms of inflammation subside.

In all cases where suppuration is indicated at the point of the tooth, ventilation through the root or alveolus is the most immediate and certain remedy. An introduction of a little creasote, or the arsenic preparation, or nitrate of silver, is expedient. But all matter being removed from the root, clear and easy ventilation is the great essential, and insures a return of healthy action. For the last thirty years of my practice I have scarcely inserted as many pivot teeth as during my first decade, and certainly have not treated as many ulcerating teeth. It is thirty years since I commenced the use of creasote and the arsenic preparation, acting always upon the supposition that dead pulp remaining was the chief cause of alveolar abscess. Such has been the success of my ventilating and depleting practice, that I have rarely had a tooth suppurate; hence I have had but very few to treat, unless suppuration was accomplished before I saw them; but for the cure of such I have found no occasion for change of treatment. Still there are many who, wanting patience, or the will, repudiate all treatment, electing the sure remedy, the forceps.

There is, however, a large class of patients who value their teeth, but most of them take good care to prevent the necessity for treating inflamed pulps or suppurating roots, as all should. Still, there are no less than five classes of endangered pulp to which even such are exposed:

1. Where soft caries has nearly but not quite laid bare the pulp.

2. Where the pulp is actually bare, but not yet wounded or diseased.

3. Where the pulp has been wounded or irritated, but not yet inflamed.

4. Where incipient inflammation has produced pain.

5. Where local ulceration of the pulp has commenced.

All these are proper cases for treatment, but the last affords too little prospect of cure to hazard experiment, unless by the anxious request of the patient. But the *two* last-named cases, of all the cases of diseased or endangered pulps, are the only cases to which the treatment of Dr Atkinson is applicable. Nerves or pulp, not diseased, should not be irritated.

The first class of cases, where caries have well-nigh bared the pulp, should be treated with great caution. The layer of soft bone immediately over the pulp should, by no means, be disturbed; the cavity should be partially cleaned, and then filled air-tight with plaster, gutta-percha, or other soft substance, which should be kept in good condition for weeks, and until the soft bone, now delivered of chemical action, has time to harden, and the excited vessels of excrement and increment have time to take away a portion of the pulp, and substitute new dentine, thus shielding itself from danger before filling is pressed upon it; but the bone near the pulp must not be disturbed, whatever may be its color or texture.

The second class of cases, where the pulp is bare, but in good health, should not be disturbed, but after being capped with a small piece of lead, should be carefully filled as above, and remain until a new deposit of dentine insures success. The third class of cases should be treated in the same manner; healthy wounds need only to be secured against air and irritation; all cauterizing or astringing agents only impair the handiwork of nature.

There remains but one class of cases of endangered pulp to which I will now call attention. This is the danger of diseased pulp or periosteum by fracture or wearing off of the crown.

Nature has been kindly in her provisions in cases of abrasion or wearing down of the teeth. There are several animals whose term of life is fixed by the duration of their teeth; this is the case with the cattle upon our thousand hills; but that their days be not too few, nature has provided for their needs by the absorption of the dental pulp, and a corresponding supply of new dentine in its place, so that the teeth are entirely worn out without exposure of the pulp or sensitive organism. To some extent nature has made the same kindly provision for our biped race. The maturity of the human teeth is only when the pulp and the entire internal organism is absorbed, and its place occupied with new and insensible dentine. Hence, it often happens with men, whose molar teeth are wanting, that the incisors wear quite up to the

gums without becoming sensitive or painful; but occasionally the incretive and excretive vessels act too slowly, or the antagonizing teeth too rapidly, so that the sensitive organism is overtaken. And now the skill of the dentist is called into requisition. This has been my practice for forty years. I destroy the vital remains, as in a case for setting a pivot tooth, fill with a cedar plug, and drive in a gold nail, with a large head, to prevent further wear. Those who prefer it can fill and build up with soft *co*hesive gold, not *ad*hesive, as it is improperly called.

When the pulp is endangered by fracture of the crown, the treatment must be indicated by the case. If but a small piece be broken off, two remedies are at hand: drill in a short distance in the direction of the pulp, and the sensibility of the dentine will be destroyed to the extent of the cavity; this may be filled, and the tooth built out, if desired; or the actual cautery—a very hot iron—may be passed over the fracture; this will destroy its sensibility. But if the fracture comes quite near to the pulp, the remedy is more uncertain; if the pulp is not actually exposed, there is a fair prospect of cure by drilling obliquely from the pulp toward the enamel; then build over with gold, or temporarily with gutta-percha, and await the result. But if inflammation and pain follow, it will not be expedient to delay extirpation of the pulp, when an artificial crown, well inserted, would be preferable to building up with gold. And in case the fracture involves an exposure of the pulp, extirpation and an artificial crown is the obvious remedy.

ARSENIOUS ACID AS A DEVITALIZER OF THE DENTAL PULP.

BY J. FOSTER FLAGG, D.D.S.,

PROFESSOR OF DENTAL PATHOLOGY AND THERAPEUTICS IN PHILADELPHIA DENTAL COLLEGE.

(Continued from page 253.)

THE amount of this substance which is usually employed for the devitalization of a dental pulp is about the 1-25th of a grain. This quantity mixed with the same weight of acetate of morphia, and made into a thick paste with creasote, was applied upon the web of one of the hind feet of an ordinary sized frog, just at the junction of two of the toes, and fixed securely by a carefully but not tightly applied bandage. In about six hours the animal gave evident signs of indisposition; at the twelfth hour it was perfectly helpless, with occasional twitching, which continued until the eighteenth hour, after which it remained with scarcely perceptible vitality till the twenty-fourth hour, when it died. Made usual application of ars. acid and creasote (without acetate of morphia) to same sized frog in same manner; same signs as before, with the difference that death supervened in nineteen hours; action more prompt. Made usual application of ars. acid and creasote to frog weighing 5½ oz.; death ensued in four days and twenty hours.

Made usual application of ars. acid and creasote to frog weighing $7\frac{1}{4}$ oz.; death ensued in four and a half days.

Made usual application of ars. acid and creasote to frog weighing 9 oz.; death ensued in *four days.*

It is therefore demonstrated that a given amount of ars. acid will, through the medium of the circulation, induce its peculiar action in sufficient force to destroy vitality in an animal more than 100,000 times its own weight!

By the employment of Reinsch's test I obtained results which indicated the presence of ars. acid in quantity according to the following order: 1st. In the liver. 2d. In the stomach and intestines. 3d. On the cotton upon which the application was made. 4th. In the heart. 5th. In the muscular tissue of leg to which application was made. 6th. In the muscular tissue of the other hind leg, that having been chosen as the part most remote by the route of circulation from the point of application.

The frog which weighed $5\frac{1}{2}$ oz. was chosen for this examination in order that the larger ones should be reserved to test the antiseptic power of arsenious acid. The four others, ranging from two to nine ounces in weight, were kept in a warm room, and though putrescence was still more favored by laying them in contact with each other, *not the slightest change in this direction occurred!* thus showing that 1-25th of a grain would not only destroy vitality in the relatively enormous amount of tissue above mentioned, but having done so, would preserve the tissue devitalized from decomposition. I wish, at this point, to direct attention to what formerly seemed to me very singular, and requiring some lucid explanation, viz.: the fact, on the one hand, that 1-25th of a grain of ars. acid would produce death of from 10,000 to 100,000 times its own weight of tissue in from twenty-four to one hundred hours, and that so small an organ as the dental pulp should require, according to the testimony of different writers, from twelve to forty-eight hours' duration of application of the same quantity; and then, "if, on the removal of the arsenic the part be still sensitive, the renewal of the application" should be "the practice mostly advocated," or why it should ever be necessary "after the lapse of thirty-six hours" to remove the cotton wool and ascertain "the effects of the application?" The "effects," it would seem, *ought* to be, by that time, the death of the entire superior maxilla and all it contained! and yet the testimony of patient after patient is, that even then vitality, accompanied by *exalted* sensibility, exists, particularly in those portions of pulp contained in the buccal roots of superior molars and the anterior roots of inferior molars. Further, I found upon removing applications that actual experiment showed the presence of all the ars. acid (practically) which had been placed upon the cotton when it was introduced. Then came the question, why should *another* appli-

cation be requisite? and experiment soon proved that it was not so, for the same cotton, applied to the part still sensitive, produced the desired result just as promptly. Again, the question, why should this application, deep seated, do what seemed impossible for it to accomplish from its external position? Clearly, because the intervening dead tissue prevented its action upon the living structure. How long would this act as a preventive? Experiment proved that it would do so until sufficient time had elapsed to render it doubtful as to whether the final result was due to the influence of the arsenical application, or was merely the natural sequence of the septic influence exercised by the contiguity of dead pulp. Observation has led me to adopt the opinion that it is the effect of combined influences, for I have had sufficient proof that the presence of ars. acid in the structure of the pulp (though experiment shows its amount at best to be almost incomprehensibly minute) is productive of devitalization in a much shorter space of time than would be required by that degree of irritation which would be induced by the presence of dead matter alone. It has therefore seemed to me to be a matter of moment that the most ars. acid possible should enter into the pulp structure, be that *most* ever so little! That, this result may be obtained understandingly, it becomes necessary to inquire—first, how is arsenious acid introduced into the pulp tissue? I answer, through the medium of the circulation. What is the effect of an arsenical application upon a pulp? First, determination of blood, occasioning the uneasiness and throbbing of which patients generally speak about fifteen or twenty minutes after the application has been introduced. Second, congestion, occasioning the cessation of throbbing and the feeling of dull "growling" knowledge of the presence of the tooth. Third, inflammation and death of that portion of the pulp nearest to the application; and here we, as dentists, must take cognizance of the anatomy relating to the organ we are treating, for another cause of irritation, purely mechanical, has by this time commenced taking a part more or less active, according to the development of the tooth and the temperament of the patient. It must be remembered that the dental pulp is surrounded by unyielding walls; that the cavity in which it is located is comparatively quite large and bulbous in the centre of the tooth, and that the apicial foramen is almost always exceedingly minute before any exposure of the pulp is liable to occur as the result of caries. With this reflection it will be seen how promptly increased circulation would lead to strangulation, preventing first the egress and secondly the ingress of blood, and thereby stopping all functional action. Congestion, we know, does this; and here then is the solution of two results, viz.: the absence of pain during the remaining process of devitalization, and the cessation of further introduction of ars. acid into the body of the pulp. The latter of these deductions having been arrived at theoretically, it remained that

it be proven by experiment, for though some good practice is difficult to reconcile with acknowledged theories, no theory can stand which is not demonstrable in a fair proportion of cases.

(To be continued.)

FILLING LARGE CAVITIES IN THE INFERIOR MOLAR TEETH.

BY S. B. PALMER, SYRACUSE, N. Y.

Read before the Central N. Y. Dental Association.

Gentlemen,—It will be remembered that, at the meeting preceding this, a resolution was entertained that we should introduce clinics as a portion of our exercises on this occasion, my own name among others being designated for that duty. As an association we have already enjoyed benefits resulting from the efforts to improve our social and professional condition. Addresses, essays, discussions, and the presentation of theories have not been wanting to make our gatherings interesting and profitable, yet, practically, other societies younger in years than ours are older in deeds.

The programme before us calls for only one essay, and it is not my intention to introduce another. Yet fearing the manipulations might be retarded by too free conversation, I propose to give, in as brief and comprehensive terms as we are able, the different steps in performing the operations about to be introduced.

The term clinic in medicine relates to bedside lectures; but in dentistry, at least for the present demonstration, our patient is able to sit in "the chair." Formerly we have only heard how operations were performed by members of the association; let us now strengthen memory by adding the sense of seeing also. Do not imagine that the short time we are allowed will enable me to perform or complete many operations; yet, if we get new and correct ideas how to fill but a single cavity, that knowledge may be the key to success in all similar operations. In the selection of teeth to be filled, I have chosen that class which usually presents the greatest difficulties in the way of success —those which, on account of the too rapid flow of saliva, afford insufficient time to perform the task thoroughly; for which reason many valuable teeth are too often filled with preparations greatly inferior to gold.

The position of such teeth in the mouth being unfavorable for clinics, I have prepared teeth in the lower jaw, removed from the skeleton, so that all may be able to witness the process of introducing and condensing the gold. Also, large models, that the principle of filling with cylinders may be better understood. Time forbids mention of the peculiar form of cavity before introducing the gold; yet the following suggestions

relative to the operation in general may not be out of place at this time—viz.: Prepare the cavity in the best manner you can under the circumstances; gain sufficient space to enable the operation to be performed thoroughly; keep the cavity and parts around as dry as possible during the time of filling; try to use as few instruments for each operation as will meet the demand; see that such are selected from the mass and well arranged before commencing to use them; keep a reserve within reach from which to draw in case of need. Such precautions frequently save much time and not a little confusion.

Preparation of gold.—Let it be understood that we have now under consideration but one class of fillings. For fancy operations, such as building up crowns of teeth, etc., we would use other preparations of gold; but for the cases before us, where a minute gained or lost during the operation might determine the result a success or failure, we would use No. 4 soft foil formed into cylinders; No. 3 adhesive foil in pellets, annealed as we use them, or crystal gold, which is quite as good. The cylinders, as you may see, are formed by placing a leaf of gold on a napkin, and folding it in the centre with a gilder's knife or straight-edged paper-folder, until it is narrow like a piece of tape, a little wider than the depth of the cavity to be filled. For large cavities, a whole sheet may be used in one cylinder; for smaller cavities, or to use in connection with large cylinders, one-half, third, fourth, even to one-tenth of a leaf will be sufficient.

For smaller cylinders cut the sheet into halves, thirds, or quarters before folding. The cylinder is formed by winding those strips around a five-sided hair-broach; the density is determined by the tension given while winding; the length by the width of the fold or tape; the size by the length and thickness of the piece rolled around the broach. The ends are squared by pressing between broad-pointed tweezers.

Manner of introducing gold to the cavity.—In cavities with uniform walls, without angles or fissures in the direction we wish to commence to build the plug, we would introduce as large a cylinder as could be conveyed to the place uninjured; press the same firmly to one side, which will give room for another cylinder perhaps one-half the size of the first; treat that in the same way, and thus continue until no more cylinders can be added; fill the remaining space with annealed pellets or sponge gold. If the cavity at the point most desirable to commence the filling presents an angle to form a sharp corner or fissure, use a small cylinder of suitable size to fill the same before introducing the larger; after which proceed as in case of a uniform cavity; complete the operation of filling by condensing the projecting gold; and finishing with such instruments and materials as will best accomplish the object.

Gentlemen, we are not presenting any new-method of filling teeth,

but one for that class of cavities under consideration which has been tried and found practical, and the surest one we know of by which a submarine operation at times may be avoided or successfully performed when such calamity cannot be averted. The latter operation we propose to perform, as above described, with the cavity filled with water desiring a removal of the plug to show the perfection of the operation under circumstances so unfavorable. With the foregoing remarks, we will endeavor to practically illustrate the principles set forth, feeling at liberty to answer any questions that the members of the association may wish to propound.

METHOD OF MOUNTING PIVOT TEETH.

BY M. L. BATTLE, BAINBRIDGE, GA.

FIRST expose the pulp and apply the arsenious acid paste, which should remain twenty-four hours, "or less;" then with a barbed nerve extractor remove the dead pulp, and treat with creasote and cotton till all suppuration has ceased; remove the crown of the tooth with file and incisive forceps as usual in preparing a root for pivot crowns, and with a suitable file cut down the stump as near the gum as possible without wounding it; with a bur drill (No. 18 or 20) cut out the pulp cavity one line deep, and, with a drill the size you want your pivot, drill down a quarter of an inch with Dr. Arrington's chisels (No. 2 or 3); drill the stump inside, half a line deep, with a button-shaped bower; form two pits, one on each side of the orifice, for a retaining point. The pulp cavity should be thoroughly wiped out till dry, and filled with gold as far up as the pivot will extend down; this being done, select a suitable pivot crown, grind and fit accurately on the root so as to articulate with the other teeth; then get a good piece of hickory for a pivot (a gold pivot, with screws cut on each end, is the best), pare off to proper size and length; then grind off pivot tooth till about the twentieth of an inch shorter than the tooth next to it. You will now prepare some amalgam, and fill in around the pivot until the stump is coped over. Then with the pivot crown put in and force down until it is the same length as the teeth next to it. Then pare off all the superfluous amalgam, and after the expiration of eight hours burnish. Gold may be used instead of amalgam, but it is more difficult to manipulate in stumps which have been so much affected by decay that they are mere shells down to the extremity of the fangs. By filling up with amalgam until the stump is coped over, and then forming an orifice for the pivot, crowns mounted in this way will never be exposed to the acids of the mouth.

REPLACING DRAWN TEETH.

BY G. E. CORBIN, M.D., ST. JOHN'S, MICH.

IN the DENTAL COSMOS for July I notice a statement by H. L. Eades in relation to *replacing drawn teeth.*

Being called upon to fill the cavities in two large incisors in the mouth of a young woman, he says: "Upon examination I found them so far gone that the task to me would be very difficult, and to her too painful to endure."

On the strength of this diagnosis he asserts that he extracted, cleaned, filled, and replaced the teeth—"the whole being performed inside of ten minutes."

That a tooth may be carefully extracted, properly replaced, reattached, nourished, and hence retained, is not at all anomalous.

That this process should be resorted to for the purpose of repairing defective teeth, to me, at least, *is* anomalous in the extreme.

Does not his language imply that he adopted the course pursued merely to avoid, on his own part, a "very difficult task"?

Most certainly, proper treatment of any teeth worth filling would render the operation so nearly painless as to make it cheerfully endurable.

Again, the haste with which he accomplished his "very difficult task" is not only noticeable, but astonishing.

Regardless of his mode of extracting, as well as of the time consumed in the operation, if Mr. Eades will, through the pages of the DENTAL COSMOS or otherwise, so instruct the more slow and less venturesome members of the dental profession as to enable them to insert desirable and durable fillings in from three to five minutes each, he will, I think, most certainly place the whole profession under great obligation

POLISHING WHEELS.

BY G. S. PALMER, A.M., WATERVILLE, ME.

THE suggestions of Dr. Blake, in No. 5, vol. ix., on "Polishing Instruments," I approve, and think that the sticks described by him will be found convenient in addition to what I am about to suggest.

For polishing instruments *quickly* and nicely the wheel is needed, which may, for our purpose, be easily prepared in the following manner: Take a piece of sole-leather of a size suitable for the desired wheel, make a hole through the centre and attach it to the lathe in the same manner as a corundum or cotton-polishing wheel; then with a sharp chisel turn it down to the size desired; coat the face of it with glue, and apply as much coarse emery as the glue can be made to take; put it aside to dry, and you have polishing wheel No. 1. Make another in the same way, only using flour of emery instead of the coarse, for No. 2. Form a third wheel in the same manner, but, instead of the

glue and emery, apply crocus with water, for No. 3. The wheels I use are about an inch and a half in diameter, but may be of any size convenient to the lathe, and by fastening several of these together with common shoe-pegs will give any thickness desired.

The labor of polishing is diminished by turning little grooves into the face of my wheel before applying the emery.

An excellent wheel for carrying the pumice in polishing vulcanite can be formed by fastening together two of these leather wheels with brass screws (common wood-screws), between which are three or four thicknesses of woolen cloth cut somewhat larger than the leathers. This woolen cloth carries the pumice better than anything I have yet found. When it becomes worn down to the leather, it can be removed by taking out the screws, and new cloth substituted. The leather keeps the wheel stiff and firm, and, as the cloth becomes worn down, will not scratch the plate, even though it should touch it.

STRANGULATION OF AN ALVEOLAR TUMOR.

BY E. PALMER, LA CROSSE, WIS.

I REPORT the following case, not because of its singularity, or that my method of operating is new or rare, so much as to give the result, which others may have found equally successful for accomplishing the same purpose.

The case was a tumor, about the size of a chestnut, of a fungoid character, situated over the root of the left superior lateral incisor, partly over the root of the eye tooth, and also of the central, in the mouth of a lady about thirty-five years of age, and which followed the introduction of an amalgam plug inserted in the posterior approximal surface of the eye tooth about two years since, by a neighboring dentist. Severe pain, suppuration, and a fistulous discharge through the gum, near the point of the fang, all came along in *due season*, which continued about five months before the enlargement or tumor was noticed. Hoping the tumor would disappear on the removal of the cause, I drilled out the plug, enlarged and cleansed the fang cavity after the usual manner, applying cotton with iodine and creasote, and filling with Hill's stopping. This was repeated twice a week for three weeks. At the end of this time there was no soreness in the tooth, and the tumor unchanged, only quite as sore from irritation of surrounding parts. I decided to remove it, and did so simply by passing a needle deep under the centre of its broad base, armed with fine wire, double. These ligatures were well secured, so as to shut off circulation from each section thus made, and had to be tightened but twice before the whole sloughed off. The parts were then touched with a strong solution of nitrate of silver; the tooth and its fang were properly filled

with gold; and it now remains as it was when the case was dismissed three weeks since, with no soreness or inflammation, the disease removed, and the tooth saved.

IODINE AND ACONITE IN PERIODONTITIS.

BY FRANK ABBOTT,
PROFESSOR OF OPERATIVE DENTISTRY IN NEW YORK COLLEGE OF DENTISTRY.

THE best remedy, and the one that works the most conveniently, for periodontitis, I have ever used (and I have tried nearly everything recommended), is a mixture of equal parts of officinal tincture of iodine and tincture of aconite root, applied to the gum around the roots of the tooth with a camel's-hair brush, or a portion of cotton wound on the end of a stick of orange-wood; I have been using it about a year, and, to my knowledge, it has never failed to relieve the patient. I apply it, in the early stages of inflammation, once in twenty-four hours; in very severe cases, twice. In my office practice, and in the Infirmary, I have opportunity of observing its workings to quite an extent. There are advantages in its use over other remedies which you will readily observe on trying it.

One other little thing I have just discovered; it may be old (it is certainly good enough), but is new to me. To prevent exudation from the gums, where it is difficult to use the rubber dam, dry the gum well, then paint with collodion. If not *disturbed*, it will remain dry as long as you wish.

DEATH FROM EXTRACTING TEETH.

BY SAM. LAWRENCE, LOWELL, MASS.

ALMOST every week we see in the newspapers or journals accounts of the death of some unfortunate person from excessive hemorrhage following the extraction of one or more teeth.

It appears to me that the loss of life from this cause, even where the hemorrhagic diathesis exists, is almost a crime on the part of the dental and medical faculty, especially the dentists, as they have the means at hand at all times for preventing these fatal results.

The public generally, we know, are ignorant of remedies in important and critical cases, but how the well-informed dentist or physician can excuse himself is a mystery. There may be cases in surgery where it would be difficult, if not impossible, to prevent fatal results, if the blood is in a poor condition (spanæmia, as it is called), that is, where there is lack of the recuperative qualities which are essential to produce healing. But in the extraction of a tooth, a clearly-defined bony wall surrounds the socket in which the roots formerly rested, and in a case of hemorrhage it merely requires a plug, which will completely arrest the flow of blood, and remain until granulations throw it out.

In excessive bleeding I usually apply persulphate of iron, and if that does not effect the purpose, spread out a small piece of lint or cotton as thin as possible, then take dry plaster of Paris (as much as will go into the cavity), and place it on the cotton, and make a ball or pellet, which I force into the alveolus with a blunt instrument (after removing the coagulum), and then place the finger or thumb upon it, and press evenly from three to five minutes, or until the plaster sets and the cavity is hermetically sealed. I have invariably succeeded in checking the hemorrhage in this way.

PROCEEDINGS OF DENTAL SOCIETIES.

ODONTOGRAPHIC SOCIETY OF PENNSYLVANIA.

BY THOS. C. STELLWAGEN, M.D., D.D.S., PHILADELPHIA.

A MONTHLY MEETING was held in the Philadelphia Dental College Building at eight o'clock, Tuesday evening, September 1st, 1868; in addition to the regular members, a large number of dental and medical practitioners were present.

The President, Prof. McQuillen, after calling the Society to order, and the reading of the minutes of the previous meeting, requested Prof. Kingsbury to take the chair, and made the following remarks:

Gentlemen,—Every one present no doubt is aware that the recent introduction of nitrous oxide as an anæsthetic in England has been much opposed by a number of prominent medical men there, particularly Drs. Richardson and Sansom, both of whom have devoted years to the careful study of anæsthetics, and, on account of their observations, experiments, and contributions to the literature of anæsthetics, have come to be regarded "as of authority" in such matters; and their combined opposition appears to have had considerable effect upon the medical profession, judging from the comments in the medical journals and the reports of the proceedings of medical societies opposing its use; but the dental profession of England, aware of the remarkable exemption from fatality which has attended the extended use of nitrous oxide in America—frequently in the hands of most ignorant persons—have determined to give the agent a fair trial. The result is not an uncertain one, and before another year passes by nitrous oxide, in the hands of the *progressive* members of the dental profession in Great Britain, will almost entirely supersede, as in this country, the use of ether and chloroform in the extraction of teeth.

Dr. Richardson, in addition to his opposition to the use of nitrous oxide as an agent that "had caused death in the human subject" (making this assertion notwithstanding the fact that, in 100,000 cases or more in which it has been employed in America, no fatal case can justly

be attributed to it as the direct cause), said, at a meeting of the Medical Society of London, that "*on animals it was so fatal that, with the utmost delicacy in its use, it was a critical task thoroughly to narcotize an animal with the gas without actually destroying life. In some cases, also, animals died after recovering from the insensibility.*"

In accounting for this fatality in man and animals, nitrous oxide has been denied the possession of anæsthetic properties, and the results obtained attributed to *asphyxia*, due to "*suspension of oxygenation,*" as in cases of death from the inhalation of the fumes of charcoal or carbonic acid gas, rather than impressions made upon the brain directly by the agent. It is somewhat singular to have such an explanation offered in connection with a substance which supplies an excess of oxygen to the blood. It is not my intention, however, this evening, to enter into the consideration of *how* nitrous oxide acts upon the system; but with a view of testing the accuracy of the statement quoted—which, as you will observe, was made in the most decided and emphatic manner, without the slightest limitation or reservation—I have procured a number of animals, to whom it is my intention to give the nitrous oxide in your presence, with the assistance of my friends, Dr. G. W. Ellis and Mr. James W. White, both of whom have had considerable experience in the preparation and administration of that agent.

The nitrous oxide, which had been prepared that morning by Dr. Ellis, was then given, as follows:

1*st Experiment.*—A white rabbit, in good condition, was placed on the table, held by assistants, and Barker's flexible india-rubber hood adjusted over the face of the animal, so that it could inhale the gas directly from the gum bag. A valve in the inhaler admitted of the ingress of nitrous oxide gas to the lungs, and of the egress of the carbonic acid from them. After some little resistance, the rabbit became sensibly affected by the gas, in a minute and a quarter fell over on its side perfectly motionless, so completely *narcotized* that, on being held up by the ears, feet, or tail, it made no resistance, and would have been taken for dead but for slight respiration and the evident movements of the heart on applying the hand to the chest. In two minutes and ten seconds it revived, and sprang from the table to the floor, apparently unaffected by the experience it had just passed through.

2*d Experiment.*—Another white rabbit was treated in the same manner as the first, with the exception that the gas was applied for a longer period (1 m. 20 sec.), and the animal was much slower in recovering from the effects. Several of the gentlemen, indeed, thought that life had become extinct, but, five minutes after the induction of narcosis, it was running about on the floor with its companion.

3*d Experiment.*—A kitten, about four months old—which had been suffering from the distemper, refusing solid food during the preceding five weeks, and on drinking milk almost invariably vomited it—

was then treated as the other animals had been. The resistance to the inhalation of the gas was much greater on her part, and the urinary organs were so much affected that quite a profuse discharge of urine occurred. In 1 m. 30 sec. the animal was completely *narcotized*, and remained in an inanimate condition for 1 m. 10 sec., when it gradually revived, and appeared none the worse for the free supply of the gas.

4th Experiment.—The gas was then introduced into a bell-glass receiver over a water-bath, and a frog placed under the glass, but apparently owing to the rapidity with which water absorbs nitrous oxide, the animal remained there for more than half an hour unaffected by it.

5th Experiment.—Another frog was placed in a wet bladder, the opening of which was tied tightly around the nozzle of the inhaler, and the gas passed into the bladder; in 3 m. 33 sec. the frog was lying on his back perfectly motionless, the translucence of the bladder affording a fair view of his position and condition. On untying the string and taking the animal out of the bladder, the access of fresh air revived it at once, and it jumped from the table with its usual vigor.

These experiments occupied about two hours, and some idea may be gained of the freedom with which the agent was administered to the animals by the fact that about forty gallons of gas were used up. At the close of the evening, when the meeting adjourned, the animals were perfectly comfortable.*

Dr. Ellis, in a few words, stated that, as at present administered, the value of nitrous oxide gas for anæsthetic purposes was much restricted, especially in operations upon the oral cavity, its contents, and immediate surroundings. The evanescence of the insensibility produced rendered its use in protracted operations undesirable, and more especially so where its re-exhibition could not be accomplished without a suspension of surgical manipulation. The commonly-received opinion that age impairs the purity and happy action of the gas, did not, he thought, hold good in reality up to eight or even ten weeks, since he

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* All of the animals have been under my daily supervision during the past three weeks, since the performance of these experiments, and none of them have manifested any discomfort, but, on the contrary, are in a perfectly healthy condition, the kitten in particular having improved so much under the remedy that, in a day or so after inhaling the gas, it partook freely of its food, and has been quite active and playful ever since, indicating, as Dr. Ziegler has long since suggested, that the administration of nitrous oxide may be of service in lower forms of disease.

These experiments were repeated on the *same animals* at a meeting of the *Biological and Microscopical Department* of the *Academy of Natural Sciences of Philadelphia*, Monday, Sept. 21, in the presence of Profs. Leidy, Meigs, Harrison Allen, Wood, and a large number of members, with the same results as reported above.

J. H. McQ.

had tested it after being kept in a close zinc receiver that length of time, and regarded it rather improved in mellowness and palatability.

Prof. Buckingham said that too much care could not be exercised in the manufacture of nitrous oxide, as the slightest modification in the proportions of oxygen made a compound the inhalation of which would be attended with fatal consequences. The singular exemption from fatality attending the indiscriminate use of nitrous oxide in America was the best evidence of its comparatively harmless nature. It appeared very strange to him to attribute the phenomena accompanying its administration to deoxygenation of the blood, when the agent employed contains, in comparison with atmospheric air, a large excess of oxygen.

The following letter was read by the Recording Secretary:

LANCASTER, PA., August 31st, 1868.

DR. J. H. McQUILLEN:

Dear Sir,—At a convention of dentists held on the 9th of July last, at Litiz Springs, Lancaster County, a committee was appointed to confer with the dental associations throughout this State in relation to the abuses now existing in the dental profession, and the urgent necessity for some legislative interference to restrain ignorant and unprincipled persons from the practice of dental surgery, and establish some standard of qualification calculated to shield the public from the prevailing evils of empiricism. With this end in view, we propose the formation of a State dental society, to be composed of delegates from the associations now in existence, or that may hereafter be formed upon the same general principles. In carrying out the views of the convention, the committee are of opinion that the simple proposition is sufficient to secure a favorable response, and that any resort to argument is therefore deemed unnecessary.

Be good enough to lay the matter before the Odontographic Society at its next meeting, and communicate whatever action you may take in the premises to either of the undersigned.

JOHN McCALLA, Lancaster,
S. H. GUILFORD, Lebanon,
W. NICHOLS AMER, Lancaster,
W. H. SCHOLL, Bernville, Berks County,
Committee.

Very respectfully,
JOHN McCALLA.

After a brief consideration of this letter, during which the proposal to form a State dental society, and to secure legislative enactments to regulate the practice of dentistry, were most heartily approved by the members present, it was, on motion of Dr. Stellwagen, unanimously resolved that the subject be referred to a committee of conference.

The President named as the members of the committee the following: Drs. T. C. Stellwagen, Wm. P. Henry, C. M. Curtis, and Wm. A. Breen.

The rough minutes were then read, and the Society adjourned.

WEDNESDAY, September 9th, 1868.

A SPECIAL MEETING was held at the usual place, the President, Prof. McQuillen, in the chair.

The attendance was larger and more enthusiastic than usual.

The report of the committee of conference was called for and presented as follows:

To the President and Members of the Odontographic Society of Pennsylvania.

GENTLEMEN,—In accordance with instructions, your committee has considered the subject referred to it, relative to the propriety of forming a State dental association, and would respectfully report that there is reason to believe that the formation of an organization of such a character as that proposed, would be of advantage to the profession and the community. It therefore suggests that delegates be appointed by this Society upon the same ratio as that of the American Dental Association,* to meet in convention representatives from other local societies in this State, at such time and place as may be agreed upon.

THOS. C. STELLWAGEN, D.D.S.
WM. A. BREEN, D.D.S.
CHAS. M. CURTIS, D.D.S.
WM. P. HENRY, D.D.S.

The Recording Secretary then read a letter addressed to the Society, of which the following is a copy:

MEADVILLE, PA., September 7th, 1868.

Gentlemen of the Odontographic Society of Pennsylvania,—I have just received notice of a special meeting of the society to consider the subject of the formation of a State dental association.

As other associations have taken action, and yet others will act upon that subject, I respectfully suggest *Harrisburg* as the place of meeting, and the month of January next as the time. There not being many local organizations to send delegates, would it not be well to invite all having the degree of D.D.S., and others that have had ten years' practice, to attend the first meeting? One reason for something like a general call is, that the subject of legal regulation of dental practice will be considered, and can be well digested, and then and there presented to the Legislature.

The Lake Erie Dental Association took action upon the subject last year, and had a bill presented in the State Senate by Mr. Lowry, but not pushed to a passage, because we wished the dentists more generally to act upon the subject.

Now, Ohio and New York have each a law that will enable us to combine the better parts of each, and add what is advisable, and have passed to suit our State The Lake Erie Dental Association holds its annual meeting the 29th of September, and will take further action upon the subject. Please advise me of your action before the meeting of the L. E. D. A., and oblige, Your fellow-member,

A. B. ROBBINS,
Pres. Lake Erie Dental Assoc.

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* One delegate for every five *active* members.

Dr. McCalla, of Lancaster, said that the convention which had been held at Litiz Springs, Pa., was composed of the members of the Lebanon Valley and Harris Dental Associations. The formation of a State dental association having been proposed, it met with a very unanimous approval on the part of the members of the profession present. The committee of which he was chairman had written to the Pittsburg, Delaware, and Lehigh Valley, Harris, Odontographic, Lake Erie, Lebanon Valley, Susquehanna and Pennsylvania Dental Societies. A letter had already been received from Dr. Gerhart, President of the Susquehanna Dental Society, approving of the project, and informing him that the subject would be acted upon at the next meeting of that Society.

Dr. Moffit, of Harrisburg, thought but little need be said in favor of a State society; its own merit was sufficient. He reported that all the dentists of respectable standing in the western part of the State, that he had spoken to of this movement, were in favor of it.

Dr. Head stated, as his conviction, that the advantages to be derived were too patent to require anything to be said in giving the motion.

Dr. Nones advised that a meeting of the delegates be held earlier than January, and suggested Philadelphia as the best place to meet in. He had found, from experience, in the Delaware Dental Society, which had attempted to secure the enactment of laws to regulate the practice of dentistry in the State of Delaware, that delays with legislators were prejudicial.

Dr. Tees favored Harrisburg as a place of meeting on account of its central location, and therefore easy access from all parts of the State.

Dr. Moffit seconded this, as a resident of that city.

Prof. McQuillen said this movement, which originated in the interior of the State, met with his hearty approval, and he felt satisfied that the faculties of the two colleges in this city would give it their hearty support. The time and place named, however, in the letter of Dr. Robbins, were open to the objection that the claims of students, who would be in attendance at that period upon the lectures, would preclude the possibility of the professors leaving home at that season of the year; mainly on this account he favored Philadelphia as the place of meeting, so that those who have labored for years in the cause of dental education may have an opportunity of taking part in such an important and necessary movement as the formation of a State dental society. The preliminary steps in the organization of the society, and after that the determination of what kind of laws should be demanded of the Legislature, would require time, care, experience, and ripe judgment to mature a plan which would prove permanently beneficial to the profession. It would be advisable to hold the meeting of the convention at the earliest moment possible, so that everything to be desired could be properly arranged and agreed upon. The presentation of this plan to the Legis-

lature could be intrusted to a committee, appointed by the proposed State society, with every probability of a successful issue. In asking for legislative action in this direction, it would neither be just nor politic to demand anything like proscriptive legislation in the case of persons who have been engaged in reputable practice for many years without a diploma from a dental or medical college, by making it obligatory upon them to procure a diploma, pass a State board of examiners, or give up practice. Our legislators would very properly oppose such unjust demands. The requirements of the laws to be passed should be prospective in their action *prohibiting* any one from *entering upon practice* after a certain period named, unless he shall have complied with a certain line of studies during a specified time, graduated from a dental college, and then passed an examination before a State board. There could be no reasonable objection in requiring those who have been engaged but five years in practice to do the same within a period of two years.

In conclusion, he thought some effort should be made to stimulate the formation of local societies in quarters of the State where as yet they have not been established, so that all sections may be properly represented in the proposed convention.

Dr. Moffit had been some years in practice, and felt the force of the preceding remarks, but he for one would have no hesitation in coming before a State board, and could not see any objection to the examination, except where the candidate should be so unfortunate as to fail, when of course it would be exceedingly mortifying to return home to a place where one had practiced for years. As a resident of Harrisburg, he should be very glad to have the convention assemble there; but was disposed to think that, all things considered, it would be best to hold the convention in Philadelphia, and at the earliest period practicable.

Dr. McCalla said the members of the profession in the country desired the aid, counsel, and experience of their city brethren; and he felt assured that others, like himself, would be favorable to Philadelphia as a place of meeting.

Dr. Stellwagen, as the chairman of the committee, stated that they had, as individual members of the Society, spoken of many points bearing upon this proposed action, but they did not feel called upon to embody but the one suggestion in their report, as the others could be presented at the meeting.

It was not without careful consideration of the various advantages offered for holding the convention of delegates in the different cities and towns of our State, that they had unanimously preferred Philadelphia, for the following reasons:

First. The two dental colleges being *foci* for the profession, were ever ready and willing, nay bound, to aid with all their power in any movement for its advancement. Their rooms and museums are cheerfully placed at the disposal of all meetings of societies which are located

here; and would, without doubt, be open for the use of the convention.

Second. The presence of the trustees and professors of our colleges would be desirable as a mark of respect to the degree which they confer, as well as for the assistance they could give, owing to their familiarity with legislative enactments. A meeting out of this city would at least, if held as it must be during the winter course of lectures, necessitate the neglect of one of their two duties—the colleges or the convention.

Third. The large preponderance in numbers of the profession likely to be present here, from the fact of the greater number of resident dentists, and the opportunities offered to visiting members to procure their materials from the dental depots and other necessary articles.

Finally, the importance of having all divisions settled privately, and not under the eye of the body to act upon the incorporation of the State society. Thus enabling us to present to the Legislature, by a committee, or such other means as may be deemed expedient, an undivided front with less expense and more certainty of success to the undertaking.

For the same reason they hoped the action would be taken, and the whole matter matured before the meeting of the Legislature in January, 1869.

He did not feel that, by the attempt to pass a bill of too restrictive a character, the protection desired by some against charlatanism would be obtained. This most desirable end was to be gained rather by advancing the knowledge of the earnest men of the profession and thus leaving an intelligent community to judge of their honest merits. A State association, by improving the organization of dentists, would greatly assist all desirous of advancement; while the attempt to suppress unprincipled quacks would but give them publicity and notoriety. Such action would be interpreted as an evidence of a desire for protection and aid against a class whose very ignorance renders them powerless alike for greatest good or evil.

The Society, as a Committee of the Whole, then passed the following, which was finally adopted unanimously:

Resolved, That while this Society holds itself in readiness to meet at such time and place as may be decided upon by the societies generally, they would respectfully suggest that the proposed meeting of delegates be held in Philadelphia on the first Tuesday in December.

Dr. Moffit moved that the committee of conference be continued, and empowered to correspond with other societies on this subject, carried.

Dr. J. S. Nones presented the following, which was unanimously adopted with the hearty approval of the members:

Whereas, The members of the *Odontographic Society of Pennsylvania,* recognizing the *American Dental Association* as having been largely instrumental in promoting the establishment of this and many

other local dental societies; and regarding the representative basis on which, as a national society, it rests, as the one best calculated to induce the formation of additional societies in localities where they are much needed to elevate the standard of dentistry to the dignity of a liberal profession, have learned with deep regret, that, at the meeting held recently at Niagara, the Constitution of the Association was violated in the most essential principle of the plan of organization, *i.e.* representation according to the Constitution, and therefore feel in duty bound to enter a solemn protest against such action, as subversive of the objects and aims of the Association;

Resolved, That the delegates from this Society be instructed to present this protest to the American Dental Association, and to oppose in the most decided manner any attempt at similar action in the future.

Dr. Nones, in supporting the above, said that at a time when we are attempting to secure the passage of State laws to regulate the practice of dentistry, so that it may be confined to the hands of competent practitioners, he regarded it as peculiarly unfortunate that such a retrogressive step should have occurred as the admission of delegates to the American Dental Association from a convention which has no local status and admits any one as a member, even though he be the most notorious charlatan in the land. What encouragement was there in making any effort to have dentistry regarded as a liberal profession, if there is to be no distinction in dental societies between reputable practitioners and those who display large signs, show cases, etc. on the front of their houses, with the view of attracting a gullible public? Again, representation in the American Dental Association should be confined exclusively to practitioners of dentistry, and those who are engaged in the sale of dental materials should only be received as visitors at its meetings.

Dr. Stellwagen regarded the subject in the same light as the preceding speaker, and considered that the reception of delegates from any other than permanently organized local dental societies (and, he understood by that, *State, county, or city* societies only), was a gross outrage, not only of the Constitution of the national organization, but also of the rights and interests of the local societies which had been represented in that body. Greater care should be exercised in the future to send the best men from each society as delegates. He thought the profession at large should discountenance such meretricious displays as show cases, by withholding all countenance from those who have recourse to such means to gain practice. For his part he did not wish to come in contact with such persons.

Dr. Tees could not understand why the convention should desire representation in the American Dental Association, as its most earnest supporters had been opposed to the organization of that body. With respect to the employment of adventitious agencies to secure practice, he regarded it as the bounden duty of dental societies to withhold fel-

lowship from all who make disgusting and discreditable exhibitions with that end in view.

Dr. Head moved that a special assessment of three dollars ($3), in addition to the annual dues from each member for the present year, be made. Carried unanimously.

The President explained that this assessment was necessary on account of the increased expense of publishing the Transactions of the Society.

The Treasurer, Dr. Henry, made a report of the state of the finances of the Society, and it was suggested that he should notify all members in arrears.

After reading the rough minutes, the Society adjourned.

EDITORIAL.

DENTAL COLLEGES.

The season is at hand when dental students are making arrangements to leave comfortable homes, kind parents and friends, and all the endearing associations of domestic life to enter upon or complete their collegiate studies in our large cities, where, for months, they will be surrounded by strangers, who cannot always be expected to feel the same interest in them as their old associates. Changes attended by such marked contrasts should have compensating advantages of a superior order over mere private preceptorship, so far as the preparation for practice is concerned. That the dental colleges afford these is a fact so fully demonstrated that no argument is deemed necessary to prove it. The passage of State laws, making it obligatory upon students to attend college, is the best evidence of the feeling of the profession on this subject.

Year after year the number of institutions has increased, until now there are eight dental colleges in various parts of the country. Two of these, The Dental School of that time-honored institution, Harvard University, and the Boston Dental College, have been established in Boston during this year. It may be asked by some, is not the supply greater than the demand? Could not the cause of education be better served if there were only two or three schools? Will not excessive competition do more harm than good? In response to these supposed queries, it may be a matter of question as to the propriety of starting a second school in a city where one has just been founded, under most auspicious circumstances, and with every appearance of meeting the demands of the profession, so far as a new enterprise is capable of doing. The law of gravitation, however, which controls inorganic solids and fluids does not fail to extend its influence to human enterprises. If an institution is not needed, and its faculty is composed of heterogeneous elements, who have no real sympathy with

each other, it will fail to secure the necessary support, and, of course, will very naturally go under. On the other hand, although starting apparently under the most adverse circumstances, if the faculty combine those all-important elements of strength, special adaptation of each member for the position filled, combined with a harmonious unity of purpose, on the part of all, success cannot but attend their efforts, however much the progress of the enterprise may be opposed by others. Time, which tries all things, proves all things, settles such questions.

In an old country, with a contracted area of territory, two or three schools might meet all the requirements of the case, but in a new and extended country like our own, we are founding institutions, not merely to answer the present demands of the profession, but to meet (where there shall be vitality enough in each body corporate to maintain the struggle for existence) the wants of future generations, when this vast country, in place of the present sparse population, shall be occupied by at least five hundred millions of souls.

Competition in trades, in commerce, manufactures, in the arts and sciences, has not proved detrimental to the best interest of mankind, but, on the contrary, has stimulated improvement in those directions, and, as a result, we are enjoying comforts and pleasures denied to former generations. To enumerate these would demand time and space which can be well spared, for the fact is a self-evident one. That the same thing will hold good with respect to dental colleges is equally true. The profession will be the gainer by having an increased number of persons engaged in imparting the knowledge they have acquired to others. In this effort, they, of necessity, become more thoroughly acquainted with the subjects they endeavor to teach, for the most effectual way to learn anything thoroughly, is to endeavor to impart a knowledge of it to others. That the number of students in attendance upon each college will be lessened by the increased number of schools is possible, but not necessarily so, for there are thousands now in practice who need educating. Even admitting this, however, to be the case, it would be no disadvantage to the students if they receive more attention from their instructors as a consequence of that.

To secure permanent success, colleges, like other enterprises, should hold out no other inducements than those which they can fully meet; indeed, it is far better to exceed than to fall short of the expectations that students may have formed of the resources and opportunities afforded by an institution. There was a period when some of our medical colleges were disposed to pander to political prejudices; but the day is past when the success of an institution can rest upon such groveling agencies, and the practice has been abandoned by respectable schools, not only on account of its disreputable character and unprofitable nature, but the recognition that science is cosmopolitan, and has nothing to do with national, political, or religious prejudices. The application

of this to our specialty is made manifest in the fact that students from all quarters of the globe seek the dental colleges of this country for their education. In selecting institutions, students, like other people, will go where they expect to obtain the greatest return for their money, *i.e.* derive the most thorough instruction, theoretical and practical, and those schools, therefore, which afford this to the fullest extent, will be the ones most sought after.

The approaching session, it is fair to infer, will be marked by a large increase, not only in the number of colleges, but also the attendance of students upon them. That the faculties of the different schools may all be earnest workers in the great cause, and have a fair share of students, is the wish of the writer.

J. H. McQ.

PHILADELPHIA SCHOOL OF ANATOMY.

THE winter course of lectures in this Institution, by Dr. W. W. Keen, will begin on Tuesday, October 13, 1868, and will continue till the first of March, 1869. It embraces Descriptive and Surgical Anatomy, illustrated by Dissections, Models, Drawings, etc. The Microscopic Anatomy of the various diseases will be shown by the class microscope. Dental students will find these lectures of great value to them, in connection with the regular college lectures on that subject. A knowledge of Anatomy, which is a study of minute detail, can be best acquired by the drill of repeated lectures, actual demonstration on the cadaver by the teacher, and of dissections by the students.

J. H. McQ.

BUR THIMBLE AS A SHIELD FOR PLUGGERS.

IN the employment of the delicate steel pluggers, whose slender shafts have replaced the large and clumsy ivory octagon handles of former days, I have found the Bur thimble of service as a shield to the palm of the hand, by allowing the end of the shaft to rest there when exerting the entire force of the hand and arm in the performance of certain operations. Others may have used it in this way, but as no mention has been made of that fact in the journals, the suggestion is offered after having tried the plan for the past year with decided satisfaction.

J. H. McQ.

BIBLIOGRAPHICAL.

A TREATISE ON ODONTALGIA. By J. PARSONS SHAW. Philadelphia: J. B. Lippincott & Co. London: Trübner & Co. Manchester: Palmer & Rowe. 1868.

In the preface to the above, the author says: "My object in the present work has been to offer a treatise which shall be so clear and

precise, that the physician, the surgeon, and the dentist may alike be able to detect the symptoms of one of the most painful of all maladies, and to correctly estimate the absurd theories which prevail in regard to the various forms of facial pain." After a careful perusal of the work, the conviction is forced upon the mind that the author has failed in the object thus distinctly enunciated, for neither the physician, the surgeon, nor the dental student, who lacks experience in this direction, would be able, from the description presented, to form an opinion of any value not merely in those intricate cases which lead to the unwarrantable destruction of an unexposed pulp or the extraction of an unoffending tooth, but even those of a less complicated character. While this is true, the work has merit as an effort in the right direction, and is calculated to prove of service to the general reader, as a popular treatise on an important and interesting subject to all. J. H. McQ.

OBSERVATIONS AND EXPERIMENTS ON LIVING ORGANISMS IN HEATED WATER. By JEFFRIES WYMAN, M. D., Hersey Professor of Anatomy in Harvard College.

A MONOGRAPH with the above title, embracing a description of a series of carefully conducted experiments bearing upon that much-vexed and to the naturalist highly important subject, *spontaneous generation*, has been received from the author, which closes as follows:

"The following conclusions appear to the writer to be justified by the observations and experiments recorded in this paper.

"1st. In thermal waters plants belonging to the lower kinds of Algæ live in water the temperature of which in some instances rises as high as 208° F.

"2d. Solutions of organic matter boiled for twenty-five minutes, and exposed only to air which had passed through iron tubes heated to redness, became the seat of infusorial life.—Exps. I.–V.

"3d. Similar solutions contained in flasks hermetically sealed, and then immersed in boiling water for periods varying from a few minutes to four hours, also became the seat of infusorial life. The infusoria were chiefly Vibrios, Bacteriums, and Monads.—Exps. IV.–XV.

"4th. No ciliated infusoria, unless Monads are such, appeared in the experiments referred to in the above conclusions.

"5th. No infusoria of any kind appeared if the boiling was prolonged beyond a period of five hours.

"6th. Infusoria having the faculty of locomotion lost this when exposed in water to a temperature of from 120° to 134° F.—Exp. page 172.

"7th. If Vibrios, Bacteriums, and Monads are added to a clear and limpid organic solution, this becomes turbid from their multiplication in from one to two days. If, however, they have been previously boiled, the solution does not become turbid until from one to two days later, and in some of the experiments not sooner than does the same solution to which no infusoria have been added."

CORRESPONDENCE.

"CHARACTER AND USES OF THE SALIVA."

Editor of Dental Cosmos: In the September number, page 471, there is a notice of the above paper. The reporter says that the author "found the saliva to be *acid*" in various animals, "and concluded that healthy saliva is not neutral in its reaction in man and the lower animals."

The above does not express my views or those of the "Report." In that paper I stated that I had found the mixed saliva of the mouth to be acid in nearly every *person* whom I had examined, being more than two hundred. Nearly all were in a fair state of health. All but about fifteen claimed to be in good health.

That I had found in every case, in a minute or two after a meal, the saliva to be either *alkaline* or neutral.

That I consider a *physiological* condition of the mixed saliva to be either alkaline or neutral. That I found the saliva of the lower animals, such as horses, cows, etc., to be *alkaline*, provided they were living in a natural condition, or had really physiological habits.

That I had found the saliva of cows, shut up where large numbers were herded together in stables, to be acid.

That I concluded the artificial mode of social life to be the cause of an acid reaction in mixed saliva.

That if we lived as simply and naturally as the brute creation, the mixed saliva would be either alkaline or neutral.

If the "Report" should be published in the "Transactions," any one who is interested will find, on reading it, that I arrived at just opposite conclusions from those stated to be the author's in the September number of the Dental Cosmos.

Henry S. Chase, *St. Louis, Mo.*

Dr. Chase's note gives a much more distinct and understandable account of his views on the character and uses of the saliva than his paper did, as read before the Association by a gentleman who was seemingly unacquainted with the handwriting of the author. I am glad Dr. Chase has seen fit to notice the matter, as my impression concerning his views was held in common with others present. There was no intention to misrepresent the Doctor.

W. C. Horne.

SELECTIONS.

Delaware Legislation on Dentistry.—The following is an Act to incorporate a State Dental Society in Delaware:

Section 1. *Be it enacted by the Senate and House of Representatives of the State of Delaware in General Assembly met* (two-thirds of each branch concurring therein), That the Dental Graduates associated as the

President and Fellows of the Dental Society of Delaware, be, and they are hereby incorporated, and by that name shall continue to be a corporation in fact and in law, with perpetual succession, and with all the franchises, powers, and incidents of a corporation aggregate.

SEC. 2. They may hold an annual stated meeting, at such place within this State, and at such time as they may choose, and may choose by ballot and by a majority of votes from among the fellows a President of said Society, a Dental Board of Examiners for the State, and such other officers as they shall deem necessary, to serve until the next annual stated meeting, and until others are chosen. And at this or any other meeting of said Society, duly convened according to its by-laws, they may choose and admit other fellows proposed according to such by-laws for admission into the Society.

SEC. 3. The Dental Board of Examiners shall be composed of as many fellow graduates as the Society shall deem proper. The said Board shall appoint its own President and Secretary, shall have power to grant licenses under their signatures for the practice of Dental Surgery in this State, and they are required to grant such license to any person applying therefor who shall produce a diploma from a respectable Dental College, or shall upon full and impartial examination be qualified for such practice. (See Physician.)

(For Sections IV., V., and VI., see Revised Statute.)

SEC. 7. That all Dentists now practicing within the State shall be allowed three years to become graduates of a respectable Dental College, and if unable to comply with said requisition, one year additional may allowed, provided good and timely reasons be given to the Board of Dental Examiners, who shall have power to act therein, or failing to comply therewith, shall be deemed guilty of misdemeanor, and as a penalty therefor the name or names of parties so offending shall be published in the public journals of this State as not entitled to the distinction of a regular doctor of Dental Surgery.

That all practitioners of Dentistry coming into the State on and after the passage of this Act shall be graduates of a respectable Dental College, and shall come before the Dental Board of Examiners, and receive a license to practice Dental Surgery within the State; any one failing to meet said requirements herein set forth shall not be allowed to practice said art, and charge or demand any compensation therefor without having first obtained from the Dental Board of Examiners a license as aforesaid then in force, and any person who shall offend against this section, shall be deemed guilty of a misdemeanor, and shall for every such offense be fined not less than fifty dollars, nor more than one thousand dollars, and have said offender's name published in the public journals of the State, as not entitled to the distinction of regularly authorized doctors of Dental Surgery; said section shall not be construed to prohibit any person without license or permit from practicing Dental Surgery gratuitously and accepting any gratuity therefor, though no compensation for such practice can be lawfully charged, demanded or recovered; or to prevent medical doctors from extracting teeth in cases of emergency.

Referred for consideration and final action at the next semi-annual meeting, preparatory to presenting it to the next Legislature and praying its passage as a law.

By Order of the Delaware Dental Association.

H. C. REGISTER, *Corresponding Secretary.*

PERISCOPE OF MEDICAL AND GENERAL SCIENCE IN THEIR RELATIONS TO DENTISTRY.

BY GEO. J. ZIEGLER, M.D.

Difficult Dentition: A Brief Inquiry into its Causes and Treatment. By J. H. JAMES, F.R.C.S., etc.—"Among the various conditions which affect the mortality of our species, there are few which exceed in importance that of dentition. The lowest statements of its amount are very considerable, and if to these are added those which occur from the febrile diseases of infancy, falling upon those who are undergoing the process, the total is large indeed. Furthermore, it ought to be considered that, while all other conditions which engage the attention of medical practitioners are only occasional, dentition is the lot of all who have passed the first few months of infancy. These being the facts, it might be supposed, *à priori*, that the subject would have engaged the attention of the profession in an especial manner; but although the works which are intended to deal with infantile diseases show no want of this, yet, as regards the interest it has engaged, it falls very far short of others of much less real importance. The reason is obvious: dentition, like many other things, is too common to be specially regarded. I should not, however, have intruded any observations of my own, but for two reasons. One is, that the treatment by lancing appears to be getting into disrepute, for no sufficient reason as far as I can see; and secondly, that authors, even of the highest authority, differ as to the mode in which it should be practiced. A few instances will suffice to prove that it is so. Dr. Copland* and Dr. West† (whose abilities entitle them to every respect) lance the gums in difficult dentition in a very modified degree, their object appearing to be simply the relief afforded by taking blood, and avoiding, rather than seeking, the division of the capsule; while Underwood,‡ Sir J. Clark,§ and Dr. Joy,‖ all insist upon the necessity of relieving the tension as well as taking blood. The question, as far as I can judge, is decidedly in favor of the latter practice, and although I cannot boast of the experience which these authors have had at their command, yet nearly fifty years' observation has enabled me to judge what the results have been in a very considerable number of cases; and although numerically inferior, yet as I had an opportunity of watching most of them during the whole period of dentition, and was much interested in their well-doing, I may perhaps be considered as not speaking on the subject without some warrant.

"Why is dentition ever difficult? Perhaps I may be allowed to make a few remarks upon the subject, commencing with normal dentition. The nascent tooth, with its capsule, is extremely vascular and sensitive, if we may judge from the supply of vessels and nerves. When it is completed, the crown becomes coated with enamel, which has neither vessels nor nerves; in point of fact, is not itself living matter, though

* Dictionary of Practical Medicine, vol. i. p. 505.
† West on Diseases of Infancy and Childhood, p. 523.
‡ Underwood on Diseases of Children, vol. i. p. 213.
§ Sir J. Clark on Diseases of Children, p. 71.
‖ Encyclopædia of Medicine, vol. i. p. 519.

connected with it, and, like all other matters devoid of life while contained within the body, a disposition to be discharged obtains, until the enameled crown has escaped through the gum, the process being accelerated by the elongation of the roots, to which indeed it has been wholly ascribed; whereas, in point of fact, the softening and absorption of the living tissues to give it exit is precisely similar to what is occasioned by other dead matters; and so little is the disturbance that the tooth sometimes appears without any indication of pain. This is normal dentition.

"What are the causes of dentition being otherwise than normal; in other words, what are the causes of difficult dentition? The first is local and general plethora and congestion, often promoted by too full diet, or too much heat about the head. This appears to have been considered as an especial cause; but in many cases it may be doubted whether it is not rather an effect than a cause, for a free lancing will often give effectual relief.

"The second is the occurrence during dentition of any of the febrile diseases of childhood, which, falling upon the subject while dentition is going on, induces an inflammatory action and its consequences, to be hereafter stated.

"Third, an opposite condition, partaking more of the character of cachexia, where the child is naturally unhealthy from parentage, or is rendered so by bad nursing or feeding, or by unhealthy air.* These, probably, are the most frequent causes; and the explanation I would offer is this: that whereas the extremity of the tooth is absolutely dead matter, it follows the ordinary laws of the economy as stated under normal dentition; but whereas foreign bodies in healthy people only produce a moderate degree of irritation, in the unhealthy this proceeds to the extent of active inflammation. So in dentition, the pressure of the extremity of the tooth upon the capsule excites an amount of inflammation, where the condition is unhealthy, which causes thickening and tension both of it and the gum, and reacts on the vascular and sensitive parts of the tooth within as well as of its capsule; and the various formidable symptoms which arise during dentition are the result of the influence produced on the whole system, whether it be called sympathy, or reflex action, or anything else. The local conditions now very much resemble that which is produced in other parts of the body by the tension of unyielding membranous structures upon vascular and sensitive parts contained within them, the ill effects of such tension being but too well known. There are two points which here require elucidation. First, how is it that a cachectic state of the child should be a cause of such serious inflammation? Secondly, what treatment may be deduced from this explanation? Now, it will hardly be questioned that, where a person is healthy, the irritation produced by any foreign body will be of a moderate kind as compared with that which is occasioned in those who labor under an unhealthy condition. Thus, a splinter or a thorn may produce but little inconvenience in one person, and even fatal inflammation in another. This I propose as a reasonable explanation of the phenomena; and we are not without proofs that it is so, for a child who has had difficult dentition, under the disadvantages

* A prominent cause of difficult dentition and its sequelæ, congestion, inflammation, etc., is defective nutrition from a deficiency of the solid components of the teeth, especially of phosphate of lime.—Z.

of a bad wet-nurse or an unhealthy situation, will, if the wet-nurse or the situation be changed, go through its subsequent dentitions with little comparative difficulty. That this is a fact is pretty generally admitted; and the explanation of the fact is, I would submit, that the same local cause of irritation, acting upon a healthy instead of an unhealthy subject, produces the remarkable difference.*

"The principles of treatment may be deduced from this view of the pathology of the case. The imprisoned tooth in difficult dentition is very much in the condition of any other part of the body where vascular and sensitive parts are bound down by unyielding coverings—say paronychia, thecal, and fascial inflammations. In these, although the removal of blood from the part is undoubtedly useful, yet it does not supersede the more effectual plan of free incisions, removing the tension. Fair analogy would point out that similar treatment in difficult dentition is the best. It is the treatment supported by Underwood, Clark, and Joy, and which I have myself always found remarkably successful.

"Every one has observed the eagerness with which children during dentition bite upon hard substances. This has been supposed to give relief to the itching or irritation of the gums; but it is certain that it must have another effect—namely, that the edges of the incisors and the sharp points and tubercles of the other teeth, by pressing upon the capsule, effect from within their division, or assist at least to do so; and it is worthy of remark that, in common parlance, the child is said to be *cutting* its teeth. This may be held to be an argument in favor of the operation which facilitates it.

"A question very naturally arises as to there being any reasonable grounds for supposing that such complete division can be a cause of injury, and what. It has been said that if the incisions in the gums unite, the cicatrices offer an increased resistance to the passage of the tooth. But this argument is disposed of by the well-known fact that new-formed parts more readily give way than original structure. Has any other objection been offered to the practice of lancing the gums in difficult dentition? I will put out of the question any injury which can be done to the enamel. Those who have suffered from instruments in the hands of a dentist will not attach much importance to what the edge of a gum lancet will do. Is there any damage inflicted on the parts beneath the surface which are not seen? I should say, on the contrary, that the relief of tension on the surface is communicated to the capsule below, and a relief afforded to the inflammatory processes there; and if this be so, the organization of the tooth is much more likely to be benefited than injured by the proceeding; and although difficult dentition may lead to future decay both of the first and second set (with which the first is so closely connected), I would submit it is from the damage done by the inflammatory processes, and not by the lancet which relieves them.

"It will be remembered that I am speaking only of difficult dentition; for to meddle with a tooth which is only progressing in a normal way would be worse than useless, since in such cases a wound of the capsule would have the same ill effect that lancing a phlegmon prematurely has—it would obstruct, instead of advance, the progress of that tooth.

* This affords a strong proof that an asthenic state disposes to the production of the inflammation, while the same treatment may serve just as in inflammation from a sthenic condition.

But who would confound the pale, flabby surface of the gum in such cases, with the swollen, red, and tense condition of the parts in difficult dentition? I am not aware that any other objection has been or is likely to be urged against deep lancing.

"Before quitting the subject, I may be permitted to say a few words on disproportion—a matter which seems hardly to have received sufficient attention. Children inherit the teeth and jaws of their parents, and it may be that these do not coincide. Large teeth may occur in small jaws, the result of which will be crowding of the nascent teeth into too small a space; and although this process cannot be watched before the teeth are out, its effects may be seen subsequently in the crowded and irregular position of the teeth both in the first and second set, and those who have experienced the distress occasioned by crowding in the case of the last molars can easily form a judgment of what crowding must be in a child. Thus parentage may operate in two ways: firstly, by transmitting that ill health which is frequently a remote cause of difficult dentition; and secondly, by propagating disproportion between the teeth and the jaws. If any one doubts the probability of such conditions, let him only compare the noble set of teeth and ample jaws of the African savage with those which are too often exhibited by the races deteriorated by civilization (from which, however, the healthy rural population is comparatively exempt).

"It would extend this memoir far beyond the limits I propose if I were to go into any details of those disorders which are allowed to be the frequent result of difficult dentition. But I may remark that they are of two kinds—one, which evidently relieves the morbid condition, and probably prevents more serious consequences, such as insalivation, cutaneous eruptions, and mild diarrhœa; the second, severe affections of the alimentary, and formidable derangements of the cerebral and nervous system, or of the respiratory organs. It is in the second class of disorders that I have found efficient lancing of the gums so beneficial.

"Much depends upon the *effective manner* in which this little operation is performed; for, as the old maxim has it, 'heavy weights hang upon small wires.' If we do not completely secure the head of the child, we may be baffled in our endeavors to carry out our measures effectually. The woman who holds the child (it had better not be the wet-nurse), seated on a low chair, lays it across her lap, so that the head may come between the knees of the operator, seated a little higher, so that it can be held as if in a vice; he will then have the jaws at his complete command, may examine them as to the necessity of interference, and, if necessary, lance them effectually. The incisors require a single, the remaining teeth, including the cuspidati, crucial incisions. This plan will occasion much less distress to the parent than a struggle to fix the head in any other way.

"I have only now to add that I have confined my observations to the subject of lancing the gums in difficult dentition, the other modes of treatment required having been fully and ably stated by the best authorities."—(*The Lancet.*)

Phosphate of Lime, Absence of in Mother's Milk a Cause of Infant Mortality.—"The *Courrier Médicale*, of Paris, in a very able article on the mortality of infants, attributes it in a great many instances to the insufficiency of the development of bone, and adds that the milk of a healthy nurse ought to contain two and one-half grammes of phos-

phate of lime, which is the basis of all osseous matter. From observations made, it appears that scarcely one in ten women has milk coming up to this standard, and, therefore, the infants, it is said, necessarily perish or grow up sickly, and probably deformed."—(*Med. Record* and *Boston Med. and Surg. Journ.*)

Phosphate of Lime, its Assimilation and Therapeutical Employment.—"We notice in *Le Mouvement Médical* (No. 17) a summary of a recently published Mémoire of MM. Dusart et Blanche, who have made a number of experiments upon animals and men, to ascertain the action of the gastric juice upon phosphate of lime. They find that much of the phosphate of lime of commerce is nothing more than carbonate of lime, and to this cause they attribute the varying experiences of different observers.

"They have found that the hydrated phosphate of lime, and recently precipitated, is the most suitable for assimilation; and in their experiments they employed the lacto-phosphate of lime, the ultimate result of the action of gastric juice upon phosphate of lime. They made some experiments on Guinea-pigs, in whom they produced fractures, and they found that the increase in the weight of the bones of such of the animals as were submitted to the action of the phosphate of lime, exceeded that of others placed under ordinary regimen more than thirty-three per cent., though all the animals were given exactly the same quantity of aliment.

"They administer two grains of the lacto-phosphate of lime to the ounce of syrup, daily, in soup.

"Dr. Perate has found this lacto-phosphate of lime extremely beneficial in dyspepsia, from insufficient secretion of the acid of the gastric juice."—(*Medical Record* and *The Druggists' Circular.*)

Hyperostosis.—In the report of the proceedings of the Annual Congress of German Naturalists and Physicians (*Med. Times and Gaz.*), it is stated that "Professor Friedreich, of Heidelberg, spoke about profuse hyperostosis, and introduced a patient whose every bone appeared to be invaded by this affection. It was a man aged 26, in whom, eight years ago, without any apparent cause, the bones of the feet began to thicken; those of the legs and thighs followed suit, and within two years even the upper extremities became similarly affected, more especially the hands, which had attained a monstrous size. The disease then spread to the ribs, the sternum, the collar-bones, the shoulder-blades and pelvic bones, the vertebral column, the hyoid bone, and the zygomatic, palatine, and alveolar processes. The cartilages of the ears, eyelids, nose, and epiglottis were similarly thickened. Everywhere, however, the bones were perfectly smooth, and there were no tuberosities or exostoses. The development of this affection proceeded gradually and painlessly, and could only be looked upon as a manifestation of a 'diathesis ossifica.' Within the last few years the affection seemed to have become stationary. A brother of the patient had the same disease, and got it in the same progression, commencing in the feet, and thence gradually proceeding upward, but in him the cartilages were healthy. The other six brothers and sisters were unaffected. The father was said to have died of consumption; the mother was still alive and quite well."

Notation and Homologies of the Teeth of the Mammalia.—Mr. W. H. Flower read a paper on this subject before the British Association for Advancement of Science, the following abstract of which is given in the *Medical Times and Gazette:*

"The author stated that the subject which he proposed to bring before the meeting was an endeavor to ascertain how much of the generally adopted system of classification of the homologies and notation of the teeth of the mammalia—a system mainly owing to the researches of Professor Owen—stands the test of renewed investigations; how much seems doubtful and requires further examination before it can be received into the common stock of scientific knowledge; or how much (if any) is at actual variance with well-ascertained facts. One of the most important of the generalizations alluded to is the division of the class Mammalia, in regard to the times of formation and the succession of their teeth, into two groups; the monophyodonts are those that generate a single set of teeth, and the diphyodonts are those that generate two sets of teeth; the monophyodonts including the orders Monotremata, Edentata, and Cetacea, all the rest of the first class being diphyodonts. The teeth of the former group are more simple and uniform in character, not distinctly divisible into sets to which the terms incisor, canine, premolar, and molar have been applied, and follow no numerical law. The group is, in fact, equivalent to that to which the term homodont has been applied by some authors. On the other hand, in the mammalian orders with two sets of teeth, these organs are said to acquire fixed individual characters, to receive special denominations, and can be determined from species to species, being equivalent to the heterodonts. The author then showed that among the homodonts the armadilla was certainly a diphyodont, having two complete sets of teeth, and among the heterodonts many were partially, and probably some completely, monophyodonts. Moreover, that almost every intermediate condition between complete diphyodont and simple monophyodont dentition existed, especially in the sirenia, elephants, rodents, and marsupials. He then, by the aid of diagrams, showed particularly two modes of transition between monophyodont and diphyodont dentition—one in which the number of teeth changed was reduced to a single one on each side of each jaw, as in marsupials, and the other in which the first set of teeth, retaining their full number, were reduced to mere functionless rudiments, even disappearing before birth, as in the case of the seals, especially the great elephant seal. These observations showed that the terms 'monophyodont' and 'diphyodont,' though useful additions to our language as a means of indicating briefly certain physiological conditions, have not, as applied to the mammalian class, precisely the significance their author originally attributed to them. The classification and special homologies of the teeth of the heterodont mammals were next discussed. Certain generalizations as to the prevailing numbers of each kind of teeth in different groups of animals were sustained, but deviations were shown from some of the rules laid down—such as that when the premolars fall short of the typical number, the absent ones are from the forepart of the series. The general inference was that, although in the main the system of notation of the mammalian teeth propounded by Professor Owen was a great advance upon any one previously advocated, we must hesitate before adopting it as final and complete in all its details, and need not relax in our endeavor to discover some more certain method of determination.

"According to the *Lancet*, Professor Huxley pointed out the singular speculative problems suggested by the paper just read. He would not discuss the remarkable views put forward as to the nature of the successional teeth. They had all been in the habit of looking upon the milk teeth as first teeth, and permanent teeth as successional teeth. Mr. Flower asked them to look upon what were called the permanent teeth as the first form, and the milk teeth as a something superadded in the higher growths of the mammalia. This was a view of profound general significance, and if it should turn out to be correct, would oblige them to modify a great many of the ideas at present entertained.

"Professor Rolleston, in reference to whales and seals, said, looking to their teeth they were very like, but they were very nearly in relation to the external medium in which they both lived; consequently, the teeth closely correspond with that which was most in relation with the medium in which they lived—namely, their skin. In the human species they saw the greatest alteration in teeth, in correspondence with the skin; and he cited the instance of a man found in Ava by Mr. Crauford in 1817, who was covered not only over the face, but over the whole of his body, with a thick coating of hair, and that man had no back teeth at all."

"*Affections of the Nervous System Dependent on Diseases of the Permanent Teeth.*—MR. SALTER contributes to *Guy's Hospital Reports* a most interesting paper under the foregoing title, which contains much information of direct and practical value to dentists. Disorders of this kind are divided into 'those which are reflex, secondary, and remote; and those which are direct, immediate, and from contiguity. In the former category would rank epilepsy, neuralgia, paralysis; in the latter local pain, facial palsy, some forms of amaurosis, etc. In other instances, such as those in which exalted sensibility of the tegumentary nerves of the face, or erratic pains through the maxillary nerves are associated with toothache, it might be difficult to say whether the phenomena are mostly reflex or direct; they probably comprise both conditions. . . . . The posterior lower molars are but little removed from the tonsils and Eustachian tube, from the parotid region, and from the external auditory passage. The fangs of the upper back teeth are close to the orbit and its all-important contents; and more posteriorly they approach the spheno-maxillary fossa and fissure. Thus it is easy to account for the nervous complications which are directly entailed by the spread of inflammation from the periosteum of diseased teeth.

"By far the commonest reflex nervous disturbances to which dental irritation gives rise are neuralgic pains of the head; and this is especially the case where the upper teeth are implicated. In the supra- and infra-orbital nerves, the globe of the eye, the temples, and particularly a spot near the vertex, a little on one side (the side of the affected tooth), in all these regions 'dental neuralgia' is really very common; and I have observed, not unfrequently, that, where the pain has continued long, the integument has become hot, and tender, and red. . . .

"The several branches of the trigeminus appear to be the most susceptible of reflex affection, caused by the dental irritation of one of them; but next to the different elements of the fifth nerve, the branches of the cervical and brachial plexuses are most commonly involved. Thus pains in the neck, shoulder, acromion process, insertion of the deltoid, or bend of the elbow, are by no means uncommon, and with

them occasionally a loss of motor power, a weary sense of fatigue in the flexor muscles, and an inability to grasp firmly with the hand. It would really seem that there is occasionally, and in some individuals, a special and exceptional communication between the fifth nerve and those of the arm. Dr. Anstie has seen two instances in which wounds of branches of the ulnar nerve have caused reflex neuralgia of the fifth nerve. And he remarks upon this circumstance: 'That the mental perception of the patient should, in each of these cases, refer the pain, not to any point in the course of the injured nerve, but to the branches of the trigeminal, affords, in my opinion, a strong suggestion that that portion of the central nervous system with which the trigeminus is directly connected presents some congenital or acquired peculiarity of organization.' This idea is fully borne out by what one occasionally, but only occasionally and exceptionally, sees in the occurrence of brachial neuralgia and paralysis caused by dental irritation of the branches of the fifth nerve.

"Reflex nervous irritation, dependent upon dental disease, is most uncertain and capricious in its manifestations. One person will suffer much from a comparatively slight cause, while in others the same condition more severely developed will produce no such result. There is, unquestionably, in some persons a neuralgic diathesis; and it is not improbable also that, in some individuals, there may be a congenital or induced peculiarity in the centric, or, perhaps, collateral relations of certain nerves, by which the exalted polarity of one may be passed on and so reflected upon another with abnormal facility. In persons obnoxious to these forms of neuralgia from dental irritation, nothing is so liable to produce an attack as exhaustion or depressed nutrition; and patients will often tell you that the attacks only come on when they are very tired, or have gone long without food.

"*Pain* is only one of the phenomena of reflex dental nerve irritation. It may induce *muscular spasm, muscular paralysis, paralysis of some of the nerves of special sense, perverted nutrition.*

"As regards the teeth themselves which excite this exalted nervous irritability, nearly all their diseases appear capable of causing this condition. Thus:

"Caries, with or without exposure of the pulp; exostosis; hypertrophy of the crusta petrosa; nodular developments of dentine in the pulp cavity; periostitis, plastic or suppurative; impaction of permanent teeth in the maxillary bones; crowding of teeth from insufficient room—

"Each and all of the above enumerated abnormities of teeth have caused manifestations of reflex nervous irritation, though, as I have remarked, they may exist in the severest forms without producing any such result.

"Mr. Salter then records a series of cases illustrative of the various pathological conditions referred to, of which we are forced to give the following brief abstract:

"Reflex Affections.

"I. *Facial Neuralgia from Dentine Excrescence in Pulp Cavity.*—A woman, who complained of severe neuralgic pains obviously connected with an upper central incisor. The pain was of a gnawing character, abiding, but not constantly severe; frequently merely a conscious-

ness of the presence of the tooth, but at other times sharp and darting, flashing up the side of the face, etc., through all the branches of the superior maxillary division of the fifth nerve of that side, and considerably augmented by sudden pressure, a tap upon the tooth, or marked change of temperature. The tooth was apparently sound, though somewhat elongated and slightly loose. No exostosis was found on the root after extraction, but, on making a section of it (vertical, from side to side), an excrescence of dentine was discovered growing from the side of the pulp cavity and occupying, for a short space, more than half its diameter. The removal of the tooth, though accompanied with a violent paroxysm of neuralgic agony, was followed by total cessation of the pain, which never recurred.

"II. *Cranial Neuralgia from an Impacted Canine Tooth*.—Miss B—— had 'cut' all the permanent teeth in due course and position, except the left upper canine, the proper space for which was obliterated by the contact of the lateral incisor and first bicuspid. At the time when the right upper canine appeared, a hard swelling was noticed in the palate, on the left side, and toward the front of the mouth, and this slowly developed into a prominent rounded ridge, extending obliquely behind the left incisors, and left first bicuspid. No inconvenience was felt up to the age of eighteen, when severe headache, confined to a spot on the vertex toward the left side, attended by local heat, etc., temporarily relieved by pressure, made its appearance. This headache, which was recurrent in its nature, lasted until the patient was twenty-six, no actual pain being felt in the impacted tooth, although the region about it became hot and tender upon the supervention of the headache. The removal of the tooth by Mr. Cartwright—an operation involving much chipping away of the bony cavity in which it was imbedded—was followed by *immediate and permanent relief*, thirty years having elapsed with no return of the symptoms.

"III. *Intense and General Neuralgia from Exostosis on Fangs of Teeth*.—Miss B. P—— had gone through her first dentition without trouble, but on account of some crowding on the advent of the permanent teeth, an upper and lower bicuspid on either side were extracted to make room. During adolescence she was attacked by neuralgic pains, at first confined to branches of the trigeminus, but afterward extending to the arms, legs, etc., indeed, nearly the whole body. The teeth, though apparently sound, had a tendency to elongate and spread, especially the upper incisors, with which the pain was at first chiefly associated. The offending teeth always gave pain on being slightly struck. Mr. Bell removed, from time to time, the teeth most obviously connected with the neuralgia, in each instance with temporary relief of the suffering, and in every case the fangs of the extracted teeth were found incrusted with nodular exostosis, though the teeth themselves were free from caries. When Mr. Salter saw Miss P. (in 1851) only the two lower left bicuspids remained, and these were causing a continuance of the neuralgia, which ceased after their removal. On the fangs of both these teeth were the expected nodules of exostosis. This patient is stated to have been remarkably anæmic, the gums being 'like wax stained of the palest pink,' and the alveoli remaining white and bloodless for some seconds after extraction before blood enough oozed from the broken vessels to partially fill the hollow sockets.

"IV. *Neuralgia of the Arm from Carious Teeth and from undue Pressure of Artificial Teeth*.—In the case of Mrs. E——, caries of any

of the lower teeth on the left side has been immediately followed by severe neuralgic pain at a spot, small and circumscribed, on the front of the left forearm, about two inches below the line of flexion. Having now lost all her teeth, and wearing a complete artificial set, whenever the lower denture hurts the jaw on that side the same symptom is manifested. The right side has never been similarly affected.

"V. *Chronic Trismus from Impaction of Lower Dens Sapientiæ.*—In a man aged twenty-three, with large teeth and comparatively small maxillary bones, the lower wisdom teeth were imbedded, and unable, from want of room, to come into place. The result was recurrent pain and swelling within the mouth, followed by a sudden attack of 'lock-jaw,' apparently caused by contraction of the left masseter muscle, which, after four months' duration, was cured by extraction of the left second molar, the wisdom tooth being out of reach. The posterior fang of the extracted tooth was much eroded by absorption.

"VI. *Wry-neck from Carious Teeth of Lower Jaw.*—A young woman whose head had, for more than six months, been drawn down nearly to the left shoulder, with considerable pain, was relieved in a few days by the removal of a stump and a partially decayed tooth from the left side of the lower jaw.

"VII. *Epilepsy from Carious Tooth.*—A boy, aged thirteen, under the care of Dr. Ramskill, had frequent attacks of epilepsy, occurring about seven or eight o'clock in the evening. Examination detected 'a molar tooth considerably decayed, with a swollen gum around it, and partly growing over into the cavity.' It was not very tender to the touch, nor did the examination give rise to toothache. The extraction of this tooth was followed by cessation of the fits.

"VIII. *Tetanus from Mechanical Irritation of the Pulp.*—The case of a gentleman (quoted from *Tomes' Dental Surgery*), who, having broken off a front tooth, went immediately to a prominent dentist in Paris and had an artificial crown pivoted with a gold peg upon the fang. After severe pain for four or five days, trismus set in and was soon followed by tetanus and death.

"IX. *Neuralgia of Neck and Arm from Carious Molar.*—Dr. Hyde Salter, the brother of the writer, had suffered much from attacks of inflammation in the left lower anterior molar, which was extensively excavated by caries. At the age of seventeen these acute symptoms had ceased for two or three years, leaving nothing but 'an occasional grumbling uneasiness in it.' At this time neuralgic pains began to extend from the tooth down into the neck in the left side, and thence over the collar-bone down the left arm; these pains enduring for several days and then remitting. 'There was no actual pain in the tooth itself, nor any tenderness in it, nor in the adjacent gum, nor any appearance of inflammation.' 'The situation of the pain in the neck, and clavicular and supra-mammary regions, was exactly that of the descending cutaneous branches of the cervical plexus, and the part of the arm where the aching was the most intense and intolerable was at the insertion of the deltoid.' These symptoms disappeared with the extraction of the offending tooth, and have never since returned.

"X. *Paralysis of the Arm from an Impacted and Carious Wisdom Tooth.*—Miss B——, aged twenty-four, had suffered for a fortnight from paralysis of the left arm, accompanied by continuous rheumatic pain in the whole limb, arising from a carious left lower wisdom tooth, which

had pierced the gum, but was placed low down and horizontally, the crown pressing forward against the second molar. The extraction of this tooth instantly relieved the arm-symptoms. In the operation the inferior maxillary nerve was injured, 'so that the teeth on the left side of the lower jaw, and the integument of the lip around the region of the mental foramen, were numbed. This, however, passed away in a few days.'

"XI. *Neuralgia of Face, Neck, and Arm, with Partial Paralysis of the latter, from Carious Wisdom Tooth.*—Miss W—— 'was suffering from constant aching pain in the left side of the face and neck and in the left arm. The pain sometimes became intensely severe. The arm had lost nearly all muscular power.' These symptoms, after resisting all medical treatment for two years, disappeared in a few hours after the removal of the tooth.

"XII. *Amaurosis caused by Crowding of Teeth.*—In this case (reported by Mr. Hancock in the *Lancet* of 1859, p. 80), a boy, aged eleven, whose sight had been previously unimpaired, found upon waking one morning that he was entirely blind. About a month afterward he was admitted to Charing-Cross Hospital, where it was discovered that his teeth were 'much crowded and wedged together; the jaws, in fact, not being large enough for them.' Accordingly two permanent and four milk molar teeth were extracted, and 'on the same evening the boy could distinguish light from darkness, and on the following morning could make out objects. From this time his sight rapidly improved, and he was dismissed cured on the 28th (eleven days after), the only treatment beyond the removal of the teeth being two doses of aperient medicine.'

"'Dr. Watson (Lectures on Physic, fourth ed., vol. ii. p. 351) mentions a very similar case. But the blindness was confined to one eye; it recurred two or three times, and was on each occasion cured by tooth-extraction.'

"XIII. *Deafness from Carious Teeth.*—Mr. Cattlin reports the case of a lady who had for about three months suffered acute pains in a diseased right lower molar, and in the corresponding ear and side of the neck, and who had been deaf for four days. 'The inflamed tooth was extracted, and hearing returned within an hour after the operation.'

XIV. "*Perverted Nutrition from Dental Nervous Irritation.*—Under this heading three cases are quoted from Mr. Hilton's work ('On the Influence of Mechanical and Physiological Rest, etc.'), in which the tongue was decidedly furred only on the side corresponding with carious or painful teeth; one in which the hair of the left temple was bleached by unilateral neuralgia, arising from a carious molar tooth; and one in which ulceration of the auditory canal, accompanied with offensive discharges from the ear, and enlargement of one of the cervical glands, was traced to a diseased lower molar on the same side, and subsided soon after the extraction of the tooth.

"XV. *Intense Neuralgia of the Eyeball and Face; Alteration of the Color of the Iris; Carious Teeth.*—Mrs. C——, aged thirty, had suffered for ten years from severe neuralgia, affecting the left eyeball and left side of the head and face; the iris of the affected eye having changed from a deep and bright hazel to a dull gray. The left lower *dens sapientiæ* and the first upper bicuspid being found badly carious, these were extracted, and the operation 'was attended by a terrible paroxysm

of neuralgia;' but after this had subsided, the patient experienced relief for about three months, when, the old pain returning, the second upper bicuspid was found to be carious and intensely tender, and upon its removal a considerable exostosis was seen on the root. 'The pain vanished with the tooth.'

"XVI. *Superficial Sloughing of the Cheek caused by a Carious Tooth-stump.*—A young woman applied to Mr. Bell on account of a remarkable oval slough of the skin and cellular tissue, about the size of a shilling, just beneath the orbit. It was removed, but soon returned. On the extraction of a diseased stump on the same side of the upper jaw, the slough separated and the sore healed.

"XVII. *Ulceration of the Neck from a Carious Dens Sapientiæ.*—M. S——, aged twenty-two, had an ulcer in the neck, behind and below the angle of the lower jaw on the right side. It had commenced more than a year before as a painful red spot, which appeared spontaneously, and had speedily assumed its present ulcerated condition, resisting all treatment. Her appearance was perfectly healthy. The right lower wisdom tooth, which was carious, with much neighboring irritation, was extracted, and in a week or ten days the sore had healed. The ulcer was quite superficial, and had no fistulous connection with the tooth."—(*The Medical Gazette.*)

Luxation of Lower Jaw. City of Dublin Hospital. (Under the care of Mr. Croly.)—"Case 1. *Luxation of Lower Jaw (Double).* J. M., aged 20 years, a housemaid, living in the vicinity of the hospital, worked very hard, and went to bed late and tired. She yawned frequently, and then experienced a painful sensation in front of each ear, and could neither speak nor close her mouth. She came to the hospital, and presented the following appearance: her mouth was widely open, and her chin projected. She could not speak distinctly. There was a well-marked depression in front of each ear, and a prominent tumor under the zygoma of either side.

"Case 2. *Luxation of Lower Jaw (Single).* Mrs. L., aged 70 years, presented herself among the extern patients with well-marked luxation of the *left* side of the lower jaw, produced some hours previously by yawning.

"Her chin was twisted to the *right* side, and the condyle of the jaw could be easily felt beneath the zygoma. There was a depression in front of the ear. The patient could not articulate, and appeared to suffer a good deal of distress.

"Mr. Croly performed reduction in these cases in the following manner: the patient was seated in a chair, and the head held steadily against the breast of an assistant. The thumbs (only one being used in case 2), guarded by a few folds of a handkerchief, were placed in the mouth on the base of the coronoid process, and the jaw depressed. The condyles were immediately restored to their normal position by the action of the muscles. A piece of cork, of wedge-shape, and grooved for the teeth, was placed at each side between the jaws, and a four-tailed bandage applied to the head.

"*Remarks.* Luxation of the lower jaw usually occurs from yawning, and is easily recognized. Reduction was effected in these two cases by Nélaton's method, viz., by merely dislodging the condyles of the lower maxilla from their abnormal position, muscular action completing the reduction.

"Case 2 is remarkable, having occurred in a woman advanced in years, which is an unusual occurrence.

"In neither case was there a flow of saliva, nor a sudden snap on the reduction being effected, as mentioned by surgical writers."—(*The Medical Press and Circular.*)

Epulis. (Cases occurring in the practice of J. MARTIN, F.R.C.S.I.)—"Mary Green, Killcommon, aged 27 years, while pregnant of her second child, was attacked with a growth of epulis on the gums of the first and second molar teeth, lower jaw, left side. Having nursed for nine months, her health being much impaired, she consulted me; the epulis then being about the size of a large walnut. I made her wean the child, and put her on a course of chalybeate tonics. Two months after I removed both teeth, and cut down, with a saw constructed for the purpose, on each side of the epulis, then removed the intermediate parts with a cutting pliers. It healed quickly, and now, after eighteen months, has not returned.

"This operation was performed two years ago. Since I sent the above to press I have heard that she has had another baby, has nursed it for four months, and that during the past three weeks the hypertrophy of the gums has set in again, and slight enlargement at the seat of the former epulis.

"Mrs. Brennan, aged 28 years, Co. Kilkenny, consulted me for an epulis, about the size of a hazel-nut, on the gum, under the right canine and first bicuspid teeth, lower jaw; both were loosened from their attachments, there being a general hypertrophy of the gums. She was rather debilitated from nursing during the previous nine months. I made her wean the child, and put her on a course of iron and quinine. I then extracted the teeth, cut down with Hey's saw on each side of the epulis, and removed it with a cutting pliers. It healed quickly, and under the use of iod. potass., liquor arsenicalis, and iod. ferri, the gums resumed their natural state, and she recovered perfectly.

"This operation was performed two years ago, and the patient has remained quite well until very lately. Since I sent the foregoing for publication I have heard that she had another baby about three months ago, and nurses it, and that during the past three weeks some slight enlargement has shown itself in the old seat of the disease, and that all the gums show hypertrophy.

"It is remarkable, both these cases having occurred during the cachexia produced by nursing."—(*Ibid.*)

"*Dropsy of the Antrum.* (Service of Dr. DERBY.) Boston City Hospital.—K. E. M., a healthy, unmarried woman, aged 32, noticed, seven years ago, a slight swelling above the right ala nasi. Its growth was slow, and, in great measure, painless. She presented herself at the hospital, complaining chiefly of the deformity of the tumor, which had now attained the size of a walnut, and occupied the canine fossa of the upper jaw. Within the lips could be felt a projection with thin bony wall, at the roots of the molar teeth, evidently continuous with the growth externally. The nostril was not obstructed, and the palate was unaffected.

"Under ether, the wall of the antrum was punctured with a small-sized trocar at the most prominent point of the projection inside the lip. Half an ounce of thin, yellowish fluid was withdrawn, which, under the mi-

croscope, contained cholesterine plates in abundance. The tumor at once collapsed. Some swelling of the face supervened, but soon subsided, and the patient was discharged, well, in nine days. She was, however, readmitted in a week, the former symptoms having returned, indicating that the antrum had refilled. It was again punctured, and about ℥iss. of fluid evacuated. The orifice was now kept open by daily probing, and subsequently by means of a small gold-plated canula, which was retained during the day and removed at night. A purulent discharge soon took the place of the serous, but this gradually subsided, and patient was again discharged after two weeks."—(*Boston Med. and Surg. Journ.*)

"*Interosseous Suture in Operation for Double Hare-lip.*—In a recent number of *L'Union Médicale* is given an abstract of a paper read by M. Broca before the Société Impériale de Chirurgie, in which he advocates a modification of the operation of Blandin for double hare-lip complicated with projection of the intermaxillary bone.

"Although several methods have been proposed by surgeons to save the intermaxillary bones in these cases, they have hitherto only partially succeeded in obtaining the desired result, and the usual custom is still to excise the projecting portion of bone before bringing together the separated parts of the lip. To avoid this loss of bone, tending as it does to interfere with the proper development of the maxillary arch and involving the loss of the upper incisors, M. Broca has proposed the following operation:

"An inverted V-shaped piece is removed with scissors from the septum of the nasal fossæ, the base of the V being the lower border of the vomer, and its width such that when the intermaxillary bones are pushed back its branches are in contact. The hemorrhage arising from one or two small arteries contained in a bony or cartilaginous canal, which have been divided by this proceeding, is checked by galvanic cautery. The edges of the intermaxillary tubercle and of the maxillary bones are then refreshed, and they are united by two silver wire sutures. The bringing together of the soft parts must vary somewhat according to the case, and is not different from the methods employed when the intermaxillary tubercle is removed.

"This operation M. Broca has twice performed.

"The first patient was a poorly nourished infant thirteen days old, which the mother refused to nurse unless the operation was immediately performed. For two days after, everything appeared well, but the mother then disappeared with the child. The second was the child of a physician, two months and a half old. The soft parts were quite widely separated, and the intermaxillary bones projected three-fifths of an inch. Eleven months after, there was a firm bony union, but the incisor teeth had not yet appeared.

"M. Broca suggests that it might be better to operate at first only on the bones, waiting a few weeks or months before bringing the soft parts together. He thinks that after the reduction of the bony projection, the median fleshy tubercle existing in such cases would elongate and assist better in the formation of the lip."—(*Ibid.*)

"*An Instrument for keeping the Jaws apart during Operations in the Mouth or Throat.* By W. H. MUSSEY, Prof. Operative Surgery and

Surgical Pathology, Miami Medical College, Cincinnati.—The necessity for a substitute for the wooden or cork 'gay' to keep the mouth open during operations within it, especially in children, led me to the use of a large-sized wire eyelid separator, in the case of a young child with excessive hypertrophy of the tonsils, where repeated attacks of acute inflammation had caused adhesions of the glands to the pillars of the arch of the palate, necessitating the separation of the adhesions by dissections with the blunt-edged knife previous to the application of the tonsilotome.

"The 'substitution' was so satisfactory that I endeavored to improve upon it, and projected an instrument with the means to fasten it at any desired angle, the ends curved back upon the cheeks so as not to be in the way of the operator. Mr. Tieman, of New York, has given expression to the idea in the instrument represented in the accompanying cut.*

"It consists of two pieces of wire appropriately curved, united by rivets, forming hinges at the two extremities, the centre curved in the manner of the eyelid speculum, but larger, and adapted to the shape of the jaws, so as to rest when applied. Upon the alveolus of each maxilla a light bar is placed upon one side, to which a screw fastens it at any point, preventing displacement or the closure of the mouth. The two ends are bent so as to apply to the sides of the face, being entirely out of the way of the operator, who can proceed to manipulate without embarrassment.

"The dimensions of the instrument are, from joint to joint over the curvature, eight and three-quarter inches, in a direct line from joint to joint, five and one-quarter inches; the central mouth curve being one and one-quarter inch in length, and three-fourths of an inch projection internally."—(*Cincinnati Lancet and Observer.*)

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"*Extensive Removal of Bones of the Face.*—Dr. J. D. RANKIN, of Palestine, Texas, reports in the *Galveston Medical Journal*, the 'extirpation of the entire half of the superior maxillary bone, the whole of the malar bone, the entire inferior orbital plate of the superior maxillary bone, the orbital plate of the ethmoid bone, and the external angular process of the frontal bone forming the superior portion of the orbit of the eye,' involving of course the removal of the remains of the globe of the eye which had previously ruptured. The operation was for the relief of a necrosis, consequent to suppuration excited by a diseased tooth. He says 'there was not a great deal of blood lost, and but little fever following it.' The patient made a rapid recovery."—(*Humboldt Med. Archives.*)

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Compound Comminuted Fracture of the Inferior Maxilla. Case reported by J. N. PARR, M.D., Joliet, Ind.—"On June 25, 1866, I was called in haste to see a young man on whom an old log church had fallen, while he and others were trying to remove it. He was taken out of the rubbish almost dead, but had revived by the time I got there. I found, upon examination, that the submaxillary bone was fractured in three places, viz.: on the left side, the neck; on the right, the body, about half an inch om the symphysis; and the third, about midway

* Omitted.

between this and the angle. The soft parts, embracing the integument and buccinator muscle, were torn in two for most of the way from the commissure of the lips to the ear. Finding it impossible to adjust the parts, hold them, and bandage them alone, I called medical assistance. There was nothing new in the treatment. The only or chief trouble was to get the loose fragment between the second and third fracture to stay in its place. For this purpose we adjusted it, and then tied the teeth nearest the points of fracture together with a silk thread. The soft parts were stitched, and all the fragments of the lower jaw brought in proper coaptation with the upper. Then a single broad bandage, so tight that it was impossible for the teeth to slip upon each other, was passed under the jaw and over the top of the head. The patient lived on fluids about one month, and made an excellent recovery, leaving no deformity whatever. The point of interest is the simple means by which the parts were held together: no clumsy apparatus."—(*Trans. of Indiana State Med. Soc.*)

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"*Paper for Surgical Dressings.*—Dr. ADDINELL HEWSON (*Penn. Hospital Reports*), struck with the fact that paper had been used in the place of lint as a surgical dressing, in the recent campaigns of the Prussian army, tested its practicability at the Pennsylvania Hospital, and, after numerous experiments, has settled on the common newspaper as being the best and cheapest substitute for lint, linen rags, or muslin.

"The advantage of economy is no small consideration, as a yard of good patent lint costs thirty-three cents, while a sheet of paper, which equals that article in usefulness as a surgical dressing, costs only one cent.

"Dr. Hewson uses also Manilla paper coated with a thin layer of yellow wax, in the place of oiled silk. In this way a saving of from four to six hundred per cent. is gained, besides affording the advantage of discarding everything appertaining to the dressings each day, by which one source, at least, of renewing contamination experienced in the employment of oiled silk is avoided."—(*Cincinnati Lancet and Observer.*)

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Copper Poisoning: "*Cases among the Out-patients of St. Thomas' Hospital.* By EDWARD CLAPTON, M.D., Assistant Physician to the Hospital.—About a year ago a sailor came under my care suffering from chronic gastro-enteritis and other symptoms indicative of some metallic poisoning. He was a miserable object, and stated that he had been compelled during the whole time of a long voyage to drink lemon-juice which was kept in a copper tank. He informed me that all the crew suffered similarly to himself. I intended seeking out the vessel and making inquiries into the matter, but the man did not make his appearance again—the unsatisfactory and not uncommon occurrence among the out-patients, especially in respect of the most interesting and important cases. One peculiarity in this man's symptoms, which I made a particular note of at the time, was the existence of a most marked green line on the margin of the gums, and for some little distance on the teeth.

"Not long after I noticed a similar appearance in a young woman who was an artificial flower maker, and who stated that she was in the habit of inhaling the dust of verdigris and Scheele's green, which she was obliged constantly to use in her business.

"Last week, again, a patient came under my care in whom the same appearance was observed—viz., a dark green line on the edge of the gums, and a similar stain along at least half of each tooth. He was a coppersmith, working at Penn's Factory, Deptford. His general symptoms, which were of a chronic character, were vertigo, gastrodynia, flatulence, dyspnœa, frequent vomiting, some degree of wasting of the body, and a peculiar coppery taste. His tongue was moist and flabby, and pulse hard and full. He mentioned that there were fifteen others working in the same shop, and in consequence of the information which he gave me I called at the factory to-day, and was permitted to inspect the premises, and to examine the rest of the workmen.

"Even with the greatest care, it is impossible to prevent the inhalation of copper particles or fumes. The dust of the shop, when viewed in a bright ray of light, can be distinctly seen to be charged with bright metallic particles. Water, too, kept in any vessel in the room for a short time, can be shown, by tests, to be charged with copper. The fumes given off during the process of strongly heating the copper for the purpose of joining appear to be most injurious. The workmen say they have rarely suffered from any definite illness, but all complained of lassitude and giddiness, and a disinclination, when not at work, to take exercise or 'to go about,' as other workmen. Some of them were exceedingly thin and pallid. *All of them had a green stain on their teeth,* of different shades of color, varying from a light bright green to a dark greenish brown. Their perspiration had a bluish-green tinge. I examined the flannel waistcoats of several, and found them deeply stained, especially under the arms. One of them stated that, even after a hot bath on Saturday night, his white shirt next day, if in hot weather, would be quickly discolored. I noticed, too, that the wooden handles of all the hammers were stained green, from perspiration of the hands.

"I briefly mention these cases now in the hope of gaining further information as to these appearances, which I have not seen noticed; but I shall recur to the subject in a paper on an allied disease (plumbism), which I have in preparation."—(*Medical Times and Gazette.*)

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"*Musical Bullet Probe.*—At the Paris Exposition there was exhibited a probe for announcing audibly the presence of a bullet in a wound. If the points of the instrument came in contact with a metallic body, an electrical circuit was made and a small bell rang."—(*Pacific Medical and Surgical Journal.*)

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"*Transmission of Light through Animal Bodies.*—Dr. Richardson exhibited at the British Association for the Advancement of Science a lamp which he had constructed for transmitting light through the structures of the animal body. He believed that the idea that this could be effected was given in Priestley's work on Electricity; that great chemist had observed, on passing a discharge of a Leyden battery through his finger, that the structure seemed to present luminosity; but the operation was painful. A suggestion of Dr. Macintosh, last year at Dundee, had been acted on by Dr. Richardson, who had observed the motion of the heart and of respiration by direct ocular demonstration while these organs were under the influence of various bodies belonging to the ethyl and methyl series. Dr. Richardson had so far extended the principle that he was enabled to transmit light through various tissues of the bodies of large animals. The particular details of all these interesting

and elaborate experiments he described. In a child, the bones could be seen in the arm and wrist. The movements and outline of the heart could also be seen in the chest."—(*The Lancet.*)

Physiology of Anæsthesia.—"In a paper presented to the British Medical Association, Dr. G. JOHNSON observed (*Lancet*) that the late Dr. Snow proved that anæsthetic vapors prevent the combination of oxygen with the tissues in the same way as they lessen combustion. Dr. George Harley proved that narcotics mixed with the blood lessen the amount of oxygen absorbed and of carbonic acid exhaled. Unconsciousness, or anæsthesia, is immediately due to defective oxidation of nervous tissue. The causes of this defective oxidation are various: 1. A mixture of narcotics with the blood. 2. An arrest of the circulation, as in syncope and epilepsy. 3. The circulation of unoxygenized blood, as in apnœa, and when the oxygen of the blood is replaced by nitrogen or protoxide of nitrogen."*

"*Anæsthesia and the Mode of Action of Anæsthetics.*—Dr. SANSOM considered (*Ibid.*) the *rationale* of action of anæsthetics. He criticised the theory of their direct action on the central ganglia of sensation, which he considered disproved by many facts. On the contrary, they present a complete similarity with the phenomena of deprivation of oxygen. The author showed that anæsthetics produce their phenomena by inducing a suppression of oxidation in the body—(1st) directly by acting on the blood, and (2d) indirectly by modifying the forces by which the blood is circulated; and that they have no special action on sensory ganglia."

"*Thymic Acid.*—This acid, obtained from the essential oil of thym, has been proposed as a succedaneum of carbolic acid or creasote. It emits no disagreeable smell, and is powerfully antiseptic. Its composition is $C_{20}H_{14}O_2$. In a concentrated form it may take the place of nitrate of silver; and, as an antiseptic, it should be dissolved in 1000 parts of water, with the addition of a little alcohol."—(*Ibid.*)

"*Purification of Tannin.*—M. Heintz (*Zeitschrift für Chemie*) purifies commercial tannic acid by dissolving it in water, and agitating it rapidly with ether that has been well purified. The decanted solution is then filtered, the ether evaporated, and the tannin obtained free from odor or evaporation."—(*Med. Press and Circular.*)

"*Comparative Action of various Disinfecting Agents.*—Dr. Beranger-Feraud, of the French navy, after trying wood charcoal, chlorine, chloride of lime, carbolic acid, and protosulphate of iron in deodorizing the bilge water of ships, comes to the conclusion that permanganate of potassa far exceeds them all in rapidity of action and thoroughness of effect, and says: 'I made use of a solution of permanganate of potassa, of the strength of half an ounce of crystals to a quart of water. One ounce and a half of this solution, which has a fine crimson color, added to a pint of foul bilge water, effectually removed all bad odor in three minutes, with a change of color to a dirty grayish-brown.

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* Anæsthesia from nitrous oxide is doubtless principally due to the excessive quantity of carbonic acid engendered by superoxidation.—Z.

"'The purifying action of permanganate of potassa is so remarkable that its success in the disinfection of putrid matters of every kind may safely be assumed. I have derived the greatest advantage from its use for many other sanitary purposes besides those just mentioned. It not only effectually destroys the foul odors arising from suppurations, and from putrefying and fecal matters, but it acts likewise on many other odorous substances. I will cite a curious fact in confirmation of this. Having one day inadvertently imbued my hands with a concentrated solution of carbolic acid, I could not rid myself of the penetrating and offensive smell. Repeated washings with soap, followed by applications of vinegar, chloride of lime, and ammonia, failed to remove the odor. Being on the point of attending a consultation to which I was very reluctant to carry so nasty a smell, I was in despair. The idea occurred to dip my fingers in permanganate solution. The first application caused a notable diminution of the carbolic odor; after the third it had entirely gone.'"—(*Med. Press and Circular*, and *Am. Journal of Pharmacy.*)

"*Effect of the Galvanic Current upon the Tenacity of Wire.*—Mr. James Wylde has made public the results of some experiments which are of great importance to telegraphic science. He says that he found, some years since, that when intense currents were passed through the best copper wire in only one direction, its tenacity was gradually destroyed, so that it could finally be crushed to pieces by the fingers. This loss of tenacity occurred first, and in a greater degree, at the negative pole. An examination with a microscope revealed at the broken surface a complete molecular change, a crystalline structure having taken the place of the fibrous. He states, that having entered upon some extended experiments in connection with submarine explosions by means of the voltaic current, he was frequently annoyed by the breaking of one of the wires, and, in all cases, found the structure at the broken part crystalline. From these facts he infers, that intense currents, passed through submarine cables, must eventually deteriorate them, and counsels their avoidance. The frequent reversal of the current, in regard to direction, lessens or entirely prevents the molecular change in the wire."—(*Scientific American.*)

"*Coating of Cast-iron.*—Herr W. LIEKE, of Hanover, has made a series of practical experiments upon the various processes for covering cast-iron with a protecting varnish. The author's observations were made with a view of discovering some new method of protecting cast-iron objects from oxidation or rust when exposed to the damp atmosphere. In the first place, he observed that 'zinc dust,' which is now extensively produced as a waste product of zinc furnaces, can be applied with considerable advantages. Half an ounce of this zinc dust mixed with one ounce of oil varnish, and rubbed several times upon one square foot of cast-iron will, he finds, preserve the metal from rust in a variety of circumstances, but it is not entirely satisfactory when the iron is subjected to soap-water or other alkaline liquids.

"To be effective against the action of these solutions, the iron must be coated with two parts of waterglass (silicate of soda), employed in solution, marking 20° Baumé, and one part of zinc oxide intimately mixed together. This material, laid on as a thick varnish, gives the iron a kind of enameled appearance, and the protective coat will not yield to soap-water.

"In the next place, the author has studied the various methods of coating iron with other metals, such as copper, tin, and zinc, with or without the use of galvanism. In the former case he shows that when acid baths are used for this purpose, the results are always unsatisfactory, and alkalies cannot be used without decomposing the bath. To avoid this, however, Herr Lieke advocates the use of a tartrate either as a soda or a potash salt, especially for coppering iron by means of galvanism. The best results were obtained with a solution of twenty parts of crystallized sulphate of copper in 160 parts of water, which solution is mixed with fifty parts of neutral tartrate of potash dissolved in 650 parts of caustic soda solution of 1·12 specific gravity."—(*Ibid.*)

Bronzing Cast-iron.—"The following is a method of giving cast-iron the appearance of bronze without coating it with any metal or alloy: the article to be so treated is first cleaned with great care, and then coated with a uniform film of some vegetable oil; this done, it is exposed in a furnace to the action of a high temperature, which, however, must not be strong enough to carbonize the oil. In this way the cast-iron absorbs oxygen at the moment the oil is decomposed, and there is formed at the surface a thin coat of brown oxide, which adheres very strongly to the metal, and will admit of a high polish, giving it quite the appearance of the finest bronze."—(*Amer. Artisan.*)

"*Carbolic Acid in the Treatment of Conjunctivitis.*—The valuable properties of carbolic acid, as an application in diseases of the throat and gums, have been shown by dentists, and physicians who give special attention to diseases of the throat. The good results of its use in these diseases induced me to try it in diseases of the conjunctiva. I have found in about a dozen cases, at the Infirmary, both of acute and especially of chronic inflammation, that the patients made a good recovery under its use.

"It is doubtful whether it possesses any advantage over the ordinary astringents, and yet it may be a desirable agent in cases where the usual applications fail. In two cases of purulent conjunctivitis, its use between the applications of nitrate of silver, after the latter had been tried two days, seemed to rapidly overcome the excessive discharge of pus. Possibly, its antiseptic properties may aid in destroying any specific poison that may exist.

"When applied in a saturated solution to the conjunctiva, as also to the mucous membrane of the mouth, it produces an intense burning pain, which almost invariably subsides in a few moments. It produces a thin, white pellicle on the surface where it is applied, which is soon cast off, leaving scarcely any irritation."—(E. L. HOLMES, M.D., in *Chicago Medical Examiner.*)

BIBLIOGRAPHICAL.

Transactions of the Indiana State Med. Soc., at its Annual Session, held at Indianapolis, May, 1868. These proceedings afford much matter of practical importance to the profession, and exhibit a creditable degree of activity in the society from which they emanate.

The Physicians' Visiting List for 1869. Philad.: LINDSAY and BLAKISTON. This useful little manual commends itself to the profession.

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ORIGINAL COMMUNICATIONS.

LEAD WATER IN PERIODONTITIS.

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THE importance of lead water, or the *Liquor Plumbi Subacetatis Dilutus* of the U. S. Pharmacopœia, as one of the most reliable and powerful antiphlogistics, being both astringent and sedative in its action, has long been recognized, and the universality of its employment as a local application in cases of external inflammation indicates the general appreciation of its valuable properties; and yet, singular to say, no one, to the best of my knowledge, has suggested the propriety of employing it in periodontitis—at least no mention of it has come under my notice in the contributions to dental literature. This is somewhat singular when recalling the general recognition of the efficacy of the agent in inflammation. Reasoning from analogy rather than an extended experience in its employment in periodontitis, it is fair to infer that its use in this direction would be accompanied by the same beneficial results that attend its application in inflammation in other parts of the body. A few instances in which I have recently tried it, in cases where there was decided tendency to periodontitis of an aggravated character, all unpleasant symptoms passed away under its administration, and apparently owing to the influence exercised by the agent. Satisfied that in many instances this remedy would prove efficacious, I commend it to the profession as worthy of trial in the following form. To a *fluidounce* of *lead water* add *two fluidrachms* of *laudanum*, and after having thoroughly cleansed and washed out the pulp cavity of the tooth with tepid water (in cases where it is unfilled), then with a camel's-hair pencil apply the preparation to the gum, and saturate a pledget of cotton with it, and pass this into the pulp cavity, and cover it loosely with cotton, or when the irritation is not very great, with wax, gutta-percha, or

Hill's stopping, and allow this to remain until the next day, when the same course should be repeated every day, until the inflammatory symptoms subside. This application must not be continued too long, however; for it is important to bear in remembrance that this agent should be used with discretion, as unpleasant results may follow its injudicious employment. *Colica pictonum*, or painter's colic, lead palsy (diseases which attack painters and other workers in preparations of lead who are careless with respect to personal cleanliness), is reported to have followed the *long-continued* use of the acetate of lead in small doses. The material thus gradually introduced for a lengthened period eventually acts upon the nervous system, and the diseases named make their appearance. Prof. Dunglison, however, in speaking of the acetate of lead in small doses remarks that, "when continued for any length of time, it may give rise to the peculiar symptoms of lead poisoning. Yet it has been repeatedly prescribed by the author, and by a large number of respectable therapeutists in considerable quantities without the supervention of any such results."* In large doses the acetate of lead (with which the solution is made) is said to be a virulent poison. With respect to this, Profs. Wood and Bache say: "The danger, however, from overdoses of sugar of lead is not so great as is generally supposed. It has sometimes been given in pretty large doses in regular practice without any bad effects, and cases are on record where a quarter of an ounce has been swallowed without proving fatal. It may be remarked, however, that the immediate effects of an overdose are often escaped by prompt and spontaneous vomiting; and that the remote constitutional effects are not apt to occur so long as the evacuations from the bowels are not materially diminished."†

It will be observed that the effects just referred to were attributed to the action of the acetate of lead, while the preparation we are to deal with is the acetate of lead combined in certain proportion with litharge and distilled water to form *lead water*. Thus diluted, the probabilities of unpleasant results from its use are materially diminished, yet the liability attendant upon long-continued application or careless administration should always be borne in mind, for to be forewarned is to be forearmed.

An early and invariable symptom of the constitutional effects of lead *is a narrow lead-blue line at the edge of the gum* where it surrounds the necks of the teeth. This is such an important and reliable sign of lead poisoning that the administration of preparations of the metal should be at once suspended when it appears. The knowledge of the possibility of such results occurring, however, should not excite an undue apprehension of their supervention, but rather induce proper care in

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* *Dunglison's Therapeutics and Materia Medica*, p. 151.

† *United States Dispensatory* (Wood and Bache), p. 550.

the use of the remedy. As arsenic, aconite, and other powerful articles in constant use are safe and valuable agents in competent and careful hands, so this mild but effective remedy will, without doubt, prove of decided advantage in cases where its application is indicated.

DENTITION—ITS PATHOLOGICAL AND THERAPEUTIC INDICATIONS.

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(Continued from page 340.)

No part of the infantile organism is more exposed to injurious influences than the linings and contents of the oral cavity, for, intuitively, all substances within grasp are carried directly to the mouth, and it is made to constitute the most prominent organ of taction.

The mucous membrane is very susceptible to slight impressions, being accustomed to amniotic liquor in fœtal life, and to milk in the early period of extra-uterine existence; consequently a change of diet, bad and artificial nipples, use of candy or sucking-bags, and many other causes may prove directly generative of a diseased condition of a part of, or its entire surface.

It is common to observe inflammation of the mucous membrane of the mouth from the occurrence of alimentary disorders, particularly gastric catarrh, which leads to the eructation of a very irritating and acid matter; from traumatic injuries, from dyscrasia or diseases favoring its establishment, as variola, scarlatina, syphilis, typhoid fever, etc.

The fact that inflammation of the mouth or stomatitis is producible by such a variety of causes, affords no proof that dentition may not be instrumental in occasioning it, for it is not unfrequently observed as coexistent, and can be reasonably traced to no other source.

Stomatitis presents several modifications of character and appearance, and has received different names in accordance therewith, as erythematic, follicular, and ulcerative.

Erythematic inflammation of the mucous membrane may be confined to the tongue, a portion of the mouth, or it may extend over the parietes of the entire cavity; it varies in intensity and duration, in some cases proving an exceedingly mild and transient affection, while in others it may assume intense severity, cause the little patient many days or weeks of suffering, and by extension into the œsophagus and stomach, or larynx and trachea, finally prove fatal.

The simpler form of the disease is characterized by increased heat and redness of the whole or a part of the mouth, more or less dryness of the parts affected, and increased sensibility of the inflamed tissue, in-

dicated by a disinclination to take nourishment, in consequence of the pain inflicted by the contact of a foreign body.

The first signs of its appearance are fretfulness and restlessness, sudden relinquishment of the breast or bottle, and a persistent refusal of their resumption; when the inflammation is extensive it spreads over the lips, which tumefy, excoriate, and crack; it is attended by some degree of fever, and accompanied mostly by profuse ptyalism.

In its mildest forms it requires little treatment except the application of emollient washes, as a solution of sassafras pith or slippery elm; in more aggravated conditions the application of leeches to the angle of the jaws may be indicated, or the use of a mustard or cantharides plaster in the same locality; advantage is also to be derived from the employment of acetate of lead, three grains to an ounce of water, as a local application; pulv. borax and saccharum, equal parts, or chlorate of potassa, are both remedies of value, and in inflammatory conditions the internal exhibition of the latter remedy, say two grains three times a day, has proven very beneficial.

A common result of this form of stomatitis is the secretion of a white matter, which appears generally in the form of small points or patches, looking like curd, and adhering to the surface of the mucous membrane; this constitutes the "muguet" of French writers, the "thrush or children's sore mouth" of nurses, and the "aphthæ lactumina" or "aphthæ infantum" of older physicians. It has been often confounded with "aphthæ," but it differs in many points.

The preliminary symptoms are so slight as in many cases to escape observation; when pronounced, however, they are about those already enumerated as indicative of oral trouble, and are not unfrequently accompanied with languor, drowsiness, and more or less disturbance of the stomach and bowels.

If the mouth be examined, it is found hot, red, and dry, and after a time, varying from a few hours to a day or two, small white points make their appearance at the sides or extremity of the tongue, at the angles or upon the inner surface of the lips, resembling, as has been remarked, pieces of curd; if the disease be mild the inflammatory action subsides, and the flakes become detached and drop off, leaving a healthy surface beneath.

If, on the contrary, its intensity increases, the symptoms are proportionately increased and prolonged, and where, from the pernicious influences of improper or deficient food, or bad air, occasioned by crowding together a number of children in ill-ventilated apartments, a malignancy is induced, the disease proves very dangerous and fatal.

When of this aggravated type, the isolated patches increase in size, and ultimately coalesce, covering the entire mouth, tongue, and palate with one continuous morbid incrustation, which assumes a dark color;

the breath becomes fetid; the submaxillary glands swollen and painful; the saliva is abundant, offensive, and sanious; the lips and gums swollen, bleeding upon the slightest touch; diarrhœa occurs, with offensive discharge; the skin is dry and hot; the patient restless and sleepless, and, finally, the scene of suffering is terminated by death.

A great diversity of opinion has prevailed as to the character of this whitish deposit, certain authorities regarding it as a false membrane, others as coagulated mucus, and others again as a collection of cryptogamic plants. The author of the latter theory, M. Gruby, states that, "having never detected in the white matter of thrush anything else than the cryptogami just described, and the cellules of the epithelium—there being in no instance any product of inflammation present—considers himself authorized to conclude that the affection is nothing more or less than a vegetation occurring upon the living mucous membrane."

These views are dissented from by many and indorsed by others, and the diarrhœa which is present has been accounted for by a supposition that the disease has extended to the deeper alimentary surfaces, or the detached secretion, carried into the stomach and bowels by deglutition, acts as an irritant, provoking the increased discharge. It seems more likely, however, that the cause may be discovered in imperfect mastication, impaired digestion, absence of saliva, and involvement of the mucous membrane generally.

The treatment of the disease will, of course, depend upon its extent; when mild, the measures already enumerated will prove sufficient, in combination with fresh air, good food, and the warm bath; but in the more severe cases it is advised to add one-fourth part of chlorate of soda to the mucilaginous wash, or to make the addition of a small quantity of alum. Equal parts of borax and sugar, or one part of borax to six or eight parts of honey, prove efficacious and agreeable applications. Acetate of lead is highly appreciated by those who have enjoyed opportunities of testing its value in these cases. When large patches of the peculiar exudations occur, they may be touched with hydrochloric acid, one drachm, and honey, one ounce; when a gangrenous aspect presents, the following has been advised:

℞.—Mucilag. acaciæ, ℥j;
Calcis chlor. grs. xv ad xxx;
Syr. cort. aurant. ℥ss.—M.
(*Angelot.*)

or, ℞.—Decoc. cinchonæ, ℥iij;
Syrup cort. aurant. ℥j;
Sodæ chlorin. ℥j.—M.
(*Guersent.*)

Or, ℞.—Creasote, gtt. iv;
Mucilag. g. acaciæ, ℥ss;
Aq. camphora, ℥viij.—M.
(*Condie.*)

or, ℞.—Aceti, ʒj;
Alcohol, ʒiij;
Syrup simp. ℥j;
Aqua, ℥iij.—M.
(*Condie.*)

Or nitrate of silver, two to four grains to the ounce. If the bowels be very much disordered and acidity indicated or suspected, some cathartic containing an antacid may be administered, as

℞.—Calc. magnesia, ℈j;
Rhei pulv. ℈j;
Ipecac. pulv. gr. j.
Make four powders.
S. One to be given daily, or oftener.
(*Condie.*)

When, however, the case is more severe, we should resort to alterative doses of calomel, as

℞.—Calomel, ij to iij grs.;
Magn. calc. vel creta. prep. grs. xxxvj to ℈ij;
Ipecac. grs. iij.
Make twelve powders.
S. One every two or three hours.
(*Condie.*)

Or if supporting treatment be demanded by the gangrenous appearance of the exudation or threatened collapse, we must employ some stimulating tonic, as iron, quinia, erigeron, etc.

℞.—Aqua puræ, ℥iij;
Sulph. quinia, grs. 8 to 12;
Sulph. acid dilute, gtt. xv to xx;
Syrup simpl. ℥j.—M.
S. Teaspoonful every two or three hours.
(*Condie.*)

or,

℞.—Spts. of wormwood, 500 parts.
St. Ignatius bean, 250 "
Sol. potass. carb. 7½ "
Soot, 2½ "
Digest fifteen days and filter.
Dose, for one year, ¼ of a drop, two years, ½ drop.
To be more persistent, add bitter wine of iron.

This latter formula has met with high encomium from many German and American practitioners of eminence as a stimulating tonic. As it occurs here, we would mention a few directions for guidance in prescribing for children, for, to the experienced occasionally, as to the uninitiated generally, the regulation of the dose is a somewhat perplexing matter. The amount does not increase or diminish in any such regular proportion as to readily enable us to memorize it; hence, for the convenience of practitioners, rules have been furnished by Gaubius and Dr. Young, which will prove very serviceable.

Gaubius takes the dose for an adult as unity, and for other ages as follows: 1 year, $\frac{1}{13}$; 2 years, $\frac{1}{8}$; 3 years, $\frac{1}{6}$; 4 years, $\frac{1}{4}$; 7 years, $\frac{1}{3}$; 14 years, $\frac{1}{2}$; 20 years, $\frac{2}{3}$; 20 to 60 years, 1.

Dr. Young says: "For children under twelve years the dose of most medicines must be diminished in the proportion of the age, to the age increased by twelve"—thus, for a child of two years, 2 : 2+12 : : the adult dose or 1 : the child's dose or 7. Or, to state it more simply:

$\frac{2}{2+12}=\frac{1}{7}$. Hence 1 year, $\frac{1}{1+12}=\frac{1}{13}$; 2 years, $\frac{2}{2+12}=\frac{1}{7}$; 3 years, $\frac{3}{3+12}=\frac{1}{5}$, and so on; at 12 the dose is one-half that of the adult.

The next form of stomatitis is the *follicular*, or an affection more frequently known and described as aphthæ; it is most frequent about the period of dentition, in some instances no doubt as a coincidence; in others as an effect of dental irritation.

The general preliminary symptoms are those which have been mentioned, and like the other forms, it is sometimes mild in its nature and disposed to a speedy spontaneous cure; it differs from them, however, in the greater involvement of the basement portion of the mucous membrane.

It appears in the form of isolated white specks in almost any portion of the mouth, which are elevated and generally surrounded by a red circle more or less decided; as the inflammation increases the follicles become distended, and finally burst; a fluid exudes from their centre and a superficial ulceration is established; this may maintain its isolated character, or by extension and junction with neighboring ones, it may form a confluent sore.

As the disease progresses the alvine discharges are increased in frequency, though diminished in quantity, and excessively acrid, as proven by the extensive excoriation of the parts around the anus; the abdomen is swollen, and tympanites and death finally occur from exhaustion and inanition consequent upon the functional derangement of the alimentary organs.

Gangrene occurs in some cases, and is accompanied by the depressed symptoms so characteristic of its presence. Says Billard: "The edges of the ulcers shrink, and assume a ragged, flabby appearance; a brownish-colored slough forms in the centre, which, on separating, leaves a granulated surface of a vermilion hue; or in the place of a slough, the ulcers become covered with a brown, creamy fluid, that exhales a very decided gangrenous odor."

The disease is favored by everything that tends to an impairment of the general health, as a neglect of cleanliness, in failing to remove daily the sordes which collect in the mouth; want of fresh air, light, exercise, etc.

It has been stated by some authorities that one attack is the preventive of a second, although such incorrect belief has been supposed to have originated by confounding it with the form previously described.

It is unnecessary to enter into a description of the treatment, as the means employed are those already enumerated, as local applications, sulphuric and hydrochloric acids, sol. of nitrate of silver, chlorate of

soda, alum, sulphate of copper, etc., and have all been credited with virtue; and upon the appearance of the gangrenous indications described, chlorate of soda or creasote locally, and quinia, iron, and other tonics, with generous sustaining diet, are the measures recommended.

When the diarrhœa is very profuse, accompanied with griping abdominal pains, value has been ascribed to borate of soda, two to four grains, with carb. of magnesia, five to six grains, given two or three times a day, or what is preferred by Dr. Condie:

℞.—Plumbi acetatas, grs. vj. ad xij;
Calomel, grs. iij;
Ipecac. pulv. grs. ij;
Ex. Hyosciami, grs. iv. ad vj.—M.
Make 12 powders.
S. One every 3 or 4 hours.

The last form, or *ulcerative stomatitis*, is marked by the same symptoms which characterize the incubative stage of the other varieties; upon examining the mouth one or more elevated points are perceived, which, in a short time, ulcerate superficially, and gradually become deeper; they are surrounded by an inflamed margin, and covered with an ash-colored or yellowish matter; the crisis of the disease is marked by a profuse ptyalism and subsidence of the febrile excitement.

The intensity of the affection may exhibit itself in two ways, either in the number of ulcers, or the slow, unhealthy, spreading character of but one or two, in both cases the local disturbance is sufficient to occasion much constitutional disorder, as evidenced in persistent and debilitating hectic fever.

The treatment differs little or none from that prescribed for the aphthous form. The following wash has been highly recommended by Dr. Dewees, whose experience in infantile diseases is extensive:

℞.—Sulph. cupri, gr. x;
Pulv. cinchona, ℥ij;
Pulv. acacia, ℨj;
Mellis, ℥ij;
Aq. pura, ℥iij.—M.
S. To be applied to ulcers twice a day with a camel's-hair pencil.

M. Bonneau, physician to the Children's Hospital, at Paris, advises the application of chloride of lime with the bulb of the finger twice a day, the child's head being afterward tilted forward, and the mouth syringed with a mucilaginous fluid, to prevent it from swallowing the remedy.

M. Bouchut prefers mixing it with honey, 45 grains of the salt to 6 drachms of the honey, and applying it with a camel's-hair pencil.

Dr. F. W. Mackenzie, of London, recommends the application of the dilute nitric acid of the Pharmacopœia and the internal exhibition of

sesquicarbonate of ammonia and citrate of iron—the ammonio-citrate of iron will also prove a very excellent stimulant tonic in the dose of one-half to one grain two or three times a day.

The nitric acid is accredited with a remarkably prompt power of changing the sluggish, dirty, sloughy appearance of the ulcers into healthy, florid, granulating surfaces, seeming to be just adequate to the revival of the vitality of the part.

Derangements in other quarters which can exercise any influence upon the oral lesion should be met upon general principles; particular care should be observed in consulting the condition of the bowels and preserving their regularity.

It will be understood, from what has been stated, that inflammation of the mouth produced by teething, may, if uninterfered with, extend to the parotid glands, the tonsils, the pharynx, œsophagus, larynx, trachea, and even into the stomach or lungs.

It would lead to an unnecessary waste of time and space to dwell upon these separately, and specify those minute differences in appearance and treatment dependent upon peculiarity of location. Where there is a familiarity with general principles, little difficulty will be experienced in so modifying them as to make them applicable; hence we will simply notice a few points in this connection.

Parotitis is a rare attendant of dentition; when, however, it does occur, it is due to either the continuity of mucous membrane or to sympathy, as it is termed—that is, from the derangement of the nervous and circulatory organs, which follows from the intimate relationship existing between the two systems throughout the entire economy; there is again a specific parotitis or mumps, which, however, rarely occurs before the fifth year, and, if present, could scarcely be mistaken for the symptomatic form.

Now, from the extension of slight irritation or from sympathetic excitement, the function of the gland may be accelerated, and pours forth an abundant secretion. This condition of things is known as *salivation*, and is worthy of some attention as a premonitory sign of approaching tooth eruption.

We find it stated by some authors that salivation is neither occasioned nor sustained by the irritation of dentition; when, however, we notice the synchronous occurrence of the two, over and over again, we cannot but reasonably feel an inclination to couple them as cause and effect.

The secretion of saliva was formerly regarded as a simple exosmotic process, but since the investigations of more modern physiologists, it, like other secretions, is found to be induced through the agency of that subtle agent, "nerve force," acting upon the peculiar cell organization of the part—hence mental impressions, the sight of a savory dish, irrita-

tion of the afferent nerve directly or sympathetically, are a few of the many causes capable of exciting the salivary glands; and when not found dependent upon any such cause, salivation, in connection with other signs and symptoms, constitutes a very reliable indication in the diagnosis of tooth eruption.

The tonsils and pharynx may, by the extension of inflammatory action, become quite seriously involved, and, when the latter part is implicated, through the existence of stomatitis, the affection is known by the compound title stomato-pharyngitis; it may vary in form, being either acute or chronic, and calls for the treatment used to combat acute or chronic inflammation elsewhere.

Tonsillitis in infants rarely assumes the acute form manifested in adults, and under judicious management will seldom terminate in suppuration. With its symptoms I suppose most are familiar, as being just those calculated to follow an edematous condition of organs standing as sentinels upon either side of the respiratory and alimentary passages.

The treatment in the early stages consists in the application of a rubefacient externally, as:

℞.—Ol. olivæ, ℥j;
Aqua ammo. ʒij;
Spts. terebinth. ʒj.—M.

Followed by an emollient poultice, a gentle cathartic, hot footh-bath, etc.; but if the inflammation be more considerable, a few leeches applied to the neck or behind the ears, and small doses of tartar emetic in water or in a solution of sulphate of magnesia, are the measures recommended; Dr. Condie states that he has derived very great advantage from the use of a combination of hydrochlorate of ammonia, ipecacuanha, and calomel, as follows:

℞.—Ammo. hydrochlor. grs. xxxvj. to ʒj;
Ipecac. pulv. grs. ij. to iv;
Calomel, grs. iij. to vj.—M.
Make 12 powders.
S. One every 3 hours.

The peculiarities of appearance and treatment in *pharyngitis* are so slight as scarcely to deserve mention, and are mainly dependent upon a deeper penetration of the disease. It may, however, prove, from the formation of retro- or latero-pharyngeal abscesses, imminently dangerous to the existence of the patient; in such cases active measures must be used; the abscess should be evacuated, and applications made to facilitate the reparative process.

As we remarked a short distance back, the hyperæmia of the mucous membrane of the pharynx may extend even to the stomach or lungs; when, however, the symptoms assume the aggravated form consequent

upon the inflammation of such important organs, the case is removed from the observations of the dentist. This, however, should not diminish our desire to follow it, and acquaint ourselves with its peculiarities, that we may be able to consult with the general practitioner upon an equal basis, and meet emergencies when self-reliance constitutes the only resource.

Our subject will, however, compel us to forego their further consideration, yet let us reassure ourselves that inflammation is *inflammation* wherever it may exist, or by whatever title it may be designated, and calls for the same general measures, slightly modified in preparation and application to meet anatomical and regional peculiarities.

In these various forms of inflammatory action let me again mention that chlorate of potassa has been pronounced invaluable, both as a local and constitutional remedy, and my own experience leads me to a full indorsement of its merits.

(To be continued.)

ARSENIOUS ACID AS A DEVITALIZER OF THE DENTAL PULP.

BY J. FOSTER FLAGG, D.D.S.,
PROFESSOR OF DENTAL PATHOLOGY AND THERAPEUTICS IN PHILADELPHIA DENTAL COLLEGE.

(Continued from page 528.)

It is now several years since I began to doubt the truth of the "inflammatory and tooth destroying" results of arsenious treatment attributable to "duration of application," from the fact that on various occasions patients had, from sundry reasons, neglected presenting themselves at the time appointed for the removal of pulps, and had allowed a number of days to elapse which were, according to the books, sufficient to induce great trouble; but to my surprise and gratification nothing in this direction supervened—an occasional story of "pain," an occasional day of tenderness which had passed away, made up the total—and seeing no reason for other treatment than extirpation and plugging, these were performed, and the teeth are yet doing good service. Cases accumulated, examples of which may be found in the following:

Case 1.—Miss H., sanguo-lymphatic temperament; application to 2d bicus. sup. left, made appointment for the third day; that afternoon the lady left the city to visit a sick relative; sent word to me next morning; returned in *eight days*, and presented herself to make another appointment. I immediately removed application and extirpated pulp; *some sensation* and slight hemorrhage; filled the tooth one week after (my usual practice). It is now over nine years since the tooth was filled, and it has been and is perfectly comfortable.

Case 2.—Miss A., aged 18; nervo-lymphatic, loose tissue; teeth

whitish yellow, soft structure; application to 1st molar (6 year), sup. left. Without keeping her appointment for the third day after, and without advising me of her intention, she left for home (Alabama), returning in *six weeks*. She had not experienced any trouble; the application, covered with a cotton sandarac plug, was just as I had left it, no irritation about the tooth; it was prepared and filled, and two years after was doing good service.

Case 3.—Mr. P., merchant; bilio-lymphatic; aged about 40. Application to left sup. central incisor. Left for New York the next day, and a day or two following was obliged to sail for Europe on business. Presented himself *eleven weeks* after; sandarac plug still covering application; pulp slightly disagreeable—no soreness. Prepared and filled the tooth; it is doing well after having been plugged nearly nine years.

Case 4.—A coachman applied to me during the month of June, 1858, to obtain relief from "general toothache in the left upper jaw." Upon examination, I found much redness of the gums; great tenderness upon striking the teeth, and a large accumulation of salivary calculus. While engaged in demonstrating to my students its removal, I discovered a cotton plug sunken into a cavity of decay upon the articulating face of the second molar; and upon inquiry he informed me that it had been placed there during the preceding winter by one of the class at the dental college, for the purpose of "killing the nerve," with the directions that he should return the following day; from some cause he neglected doing so; the tooth gave him no trouble, and when he went again about a month after, he found the college closed! So he allowed things to remain as they were. I took away the cotton, found the usual "small piece" underneath, washed out the tooth, made an application of hydrated sesquioxide of iron in paste form (an application which I then thought favorably of theoretically, but which I now have no faith in practically), and putting a temporary filling in the cavity, intending that the tooth should be plugged by one of the young gentlemen, *I finished removing the tartar* and gave an astringent mouth-wash. At the expiration of two weeks the gums and mouth generally had assumed a normal appearance, and all tenderness of the teeth was relieved. This application had remained in the tooth between *four* and *five months*.

Case 5.—Mr. T., merchant, aged 38—nervo-lymphatic; made application to left inf. second bicuspid. In consequence of immediate departure for the West, an appointment was made for the following month—it being supposed that he would have returned by that time—a much greater delay supervened, and it was *one year and three days* before he presented himself for further operations; everything, even to the cotton and sandarac (which I then used) was found as it was left the year before; the tooth had not given any inconvenience; the pulp was extirpated, and

the filling introduced, and to this date (four years after) everything is doing well.

These are but few of many cases which have come under my observation, as the result of accident or neglect on the part of patients, and they seem to me full of interest and instruction; for it is a matter of great moment, both to dentist and patient, that this operation of devitalization and extirpation should not only be thoroughly understood, but properly, and if possible, painlessly executed. It also seemed in the line of duty that the information which had been gained as the experience of unintentional practice should be cautiously verified as the basis of future operating; I therefore instituted a gradual *increase of duration of applications*, watching carefully the cases, until year after year told me that I could with perfect safety permit them to remain until the pulps were dead and had sloughed,—thus rendering their entire removal a thing easy of accomplishment, and doing away with all the terrors to the minds of those who were about to submit to the operation. After having demonstrated this, I commenced saving such pulps as had been extirpated entire and without pain, as the result of from seven to fourteen days' application each. I tested ten of these together for ars. acid by Riench's test, which possesses the *requisite* in this case of giving the amount of this substance present; a proof of its presence was obtained, which was *duplicated* in a solution containing 100,000th of a grain of ars. acid, thus giving as the amount contained in the tissue of each pulp the one-millionth of a grain! Ten pulps, extirpated painlessly and entire, were next taken and tested, with about the same results; while from the ten cottons upon which the applications were made, quite one-third of a grain was obtained,—thus showing that no *apparently* adequate amount of ars. acid had been taken up by the pulp tissue, and that death of the organ having ensued, the dead tissue had acted for so considerable a length of time as a preventive to further exhibition of the poison. The results of these experiments seemed to me to present the solution of one of the sequences of arsenical pulp treatment, to-wit—*the subsequent putrefaction.*

The assertion was made by Dr. Goddard some eighteen years since, that the dental pulp was preserved, if destroyed by ars. acid. This is entirely incorrect; and had he known the minute quantity of this material which really entered into the tissue destroyed, he would have been no more at a loss to have accounted for the putrefaction of pulps than dental pathologists now are for the *length of time* required for decomposition to take place. Simultaneously with investigation in relation to the foregoing subject-matter, experiments have been in progress as to the most desirable and efficacious of all the proposed recipes offered to the profession—attention having been particularly directed to the purpose for which each ingredient was advocated, its fitness for the

accomplishment of its mission, *the absolute part each performed*, and the construction of an appliance which should best subserve every indication. I have the following results to offer: ars. acid in dry powder will accomplish the required devitalization; but its exhibition is productive of much pain in a majority of instances. Ars. acid, moistened with water, acts more promptly, but is equally objectionable in most cases on account of pain. Ars. acid moistened with essence of peppermint, tincture of opium, oils of cloves, anise, etc., gave the same result—generally much more pain than was satisfactory. Ars. acid and oil of creasote afforded decidedly the *least painful mixture of two* ingredients which I have at any time tested; but its effects were not always satisfactory throughout, and an occasional case would demand imperatively that a modification of this application should be made; these were invariably patients in whom the "nervous" was the basis of temperament—as the bilio-nervous, the sanguo-nervous, and the true nervous. Dry mixtures of ars. acid and acetate of morphia, sulphate of morphia, carbonate of magnesia, etc., offered modifications both as to commencement, intensity and duration of pain, but all were found objectionable. Paste made of these latter combinations, together with such oils, tinctures, etc., as have been mentioned (with the exception of creasote), proved in many instances painful and sometimes productive of intense suffering; which condition was almost invariably relieved by a gentle application of creasote—idiosyncrasies only presenting exceptions.

Creasote, then, seemed to be the ingredient which most markedly modified the amount of pain; and it was the knowledge that creasote possessed this property of obtunding sensibility that induced my father, who was the first to use it so long ago as 1836, to suggest its employment. It was *for this purpose*, and not on account of its supposed power of dissolving ars. acid, as is the impression with some, that this oil was introduced in this connection; and, indeed, I have experimentally proven, with eight grains of ars. acid and eight drachms of creasote, that even with long-continued and thorough trituration for hours, and frequent daily shaking for weeks, the acid is insoluble in the oil.

(To be continued.)

SENSITIVE DENTINE AND THE DENTAL PULP.

BY R. C. MOWBRAY, WARSAW, ILL.

MEDICINES affect different systems in a different manner, and the same medicine affects one person in one way, and another in another way. Although some remedies are a specific for a certain class of diseases, yet cases are seen where these remedies are ineffective; yet these are frequently curable cases, and the disease is removed by other remedies. This is observed in dentistry as in other specialties of medicine.

In regard to the internal use of morphia to obtund sensitive dentine, an observing brother asks "If cases are not met with where one-tenth to one-fourth of a grain of morphia will not obtund sensitive dentine?" Certainly such cases occur. I occasionally see patients whom morphia does not relieve, but on the other hand makes very restless; but such cases are not as numerous as might be supposed. I can almost invariably detect when any patient will be an unwilling subject to morphia, from the fact that *they dislike the odor of it*, while those who are benefited by its use rather like its odor, or, at least, say "it's not unpleasant" to them; but when such cases occur that the internal use of morphia has the misfortune to "entirely suspend digestion for over twenty-four hours," other treatment is necessary.

It is unfortunate for the dental profession that the majority of those who suffer with extreme sensitiveness in their teeth are naturally of a nervous temperament. Observation has convinced me that four-fifths of the cases of sensitive dentine that require treatment, without which it is impossible to operate, are in patients of a nervous temperament, suffering from nervous irritability.

The causes of nervous irritability are numerous. Every dental practitioner has probably observed that the teeth of young persons—especially those just arriving at puberty—are very sensitive; particularly is this the case with young girls in whom the catamenia has appeared, or is about to present itself. That the general system labors from this natural disturbance is obvious, and to every intelligent dental practitioner the effect is more apparent, and must be observed in its intimate relation with our specialty.

Another and a prolific cause of nervous irritability in the young is deficient growth of the maxillæ. I am inclined to think females suffer more than males in this particular also. The maxillæ usually develop and mature proportionately with the other bones, yet frequently they do not so develop, but remain comparatively contracted (we will not discuss *the cause* of their contracted condition as we see them), with little more than half the space nature designed for the cuspidatus, second and third molars.

The development and eruption of the teeth in this contracted condition of the maxillæ induces inflammation of the periosteum and irritates the pulps of all the teeth. A few days since I saw a case of very severe periodontitis, produced by the pressure of a developing superior cuspidatus. This patient, a girl of twelve or thirteen years, called to have the tooth extracted; one look at her would have convinced the most incredulous that she was suffering from a nervous irritability; do you wonder that in filling four teeth for this person, some time previous, I had to contend with sensitive dentine?

But in persons of more advanced years, ill health, disappointment,

grief, and many other causes, will produce the same nervous condition, and in those of a nervous temperament, these causes (with a little pain) makes them impatient and extremely irritable—so much so, that in many cases while operating upon the teeth their anxiety and fear alone (when no internal remedy has been given) will so affect the condition of the stomach as to lessen the supply of gastric juice, and digestion is in a great degree suspended. That the secretion of the gastric juice is much influenced by nervous conditions, is a well-known physiological fact.*

That the mind and body should be free from unusual and disagreeable excitement for the system to properly assist digestion, is a principle upon which physiologists agree. I should attribute suspension of digestion in any patient to a disturbed nervous condition, occasioned by fear and anxiety, unless I had conclusive evidence it was the effect of narcotism.

But it is asked how such cases (where morphia is forbidden) can be treated? If you have the apparatus for producing local anæsthesia by "narcotic spray" at hand, use spray upon the tooth, and in the cavity, until the parts are insensible; then, with well-formed, sharp excavators, clean the cavity; after cleaning, if the tooth remains as sensitive as before (occasionally it will), bathe it with creasote and tannin, and then fill.

In regard to the use of morphia, in combination with arsenic, in destroying the pulps of teeth—for one, I protest against its use. I am confident this combination aggravates the pain. Two parts tannin and one part arsenic, mixed with tinc. aconite, can be used in a majority of cases without pain.

The use of creasote, also, in the way it is being used by some in our profession, is a poor remedy in many cases where it is used, alike disgusting to the patient as it is useless to the operator.

To reduce acute inflammation in a dental pulp, I have prepared the following combination, and have used it with excellent success. To a drachm of glycerin (liquid measure) add what tannin it will dissolve; to this add one ounce best tinc. arnica. The way I apply it in large cavities is to cut off a piece of very fine sponge, soak it full, slightly compress it, and place in direct contact with the pulp, and then cover with anything that is at hand, and best adapted for protection. A diseased pulp that can be saved at all, will be quickly restored to health by the use of this preparation. I would like to learn *how* creasote affects the dental pulp? I claim it to be a useless remedy, so far as soothing the pain by reducing the inflammation is concerned. Creasote is good in its place, but its wholesale use belongs to the profession of other days; the intelligent and enlightened members of our profession will

* See *Dalton's Physiology*, p. 184.

certainly deprecate its use ere long, and adopt remedies that are far superior, being more effective in attaining the desired result, and much more pleasant to our patients.

No remedy is used that is (and will always remain) infallible; they all, occasionally, deceive our confidence, and our disappointment occasioned by their failure frequently threatens to precipitate our admiration into disgust.

HEMIPLEGIA AND SPINAL IRRITATION CAUSED BY DEFECTIVE TEETH; A PERFECT CURE FOLLOWING THEIR REMOVAL.

BY J. L. SUESSEROTT, M.D., D.D.S., CHAMBERSBURG, PA.

FEW cases of greater interest to the dental practitioner have ever been reported, and none in which the final issue was more satisfactory to the physician and patient than the following. Some of your readers may be disposed to consider the result merely a *post sed non propter hoc;* or in greater charity to me they might render credit to the chalybeate tonics that were administered, and declare that although *reflex action* is frequently met with, the exciting cause, as claimed by the writer, was not equal to the production of results as serious as those charged in this report:

Elizabeth H., aged 27 years, the mother of two children (the youngest, if living, would be a year old, and the oldest seven or eight years), while seated at the supper-table, on the evening of Tuesday, February 4th last, without any premonition, was suddenly seized with *hemiplegia* of the right side. Although complaining of a strange feeling in her head, she was free from acute pain anywhere. Living at some distance in the country, medical aid was not called in until the following Saturday. On making an examination of her spine, I found it excessively tender, especially over the spots known as "Tate's points." Her bowels were in a constipated condition, the relief of which was procured by an active purgative. Counter-irritation was at once established along the entire course of the spine, by the liberal application of cantharidal collodion, and, as soon as the general nervous excitement was subdued, by the use of appropriate remedies, she was ordered to take cit. ferri et quin. in 5 gr. doses, four or five times a day; at the same time active friction to the entire sides was directed to be made. No perceptible change occurred for nearly a week, when it was found that sensation was returning to the benumbed limbs, and the spasms that were excited in the spinal muscles by pressure on the spine were weaker and less frequent. At my first visit, after making a thorough examination into the working of all her organs, I was fully satisfied that the decayed teeth and dead roots that filled her upper maxilla were the pregnant

cause of the existing trouble, and I then obtained her consent to have them removed as soon as she had strength to bear the operation. After the continued use of the tonic, and a strict care of her digestive organs, she was sufficiently restored about the middle of April last, to venture upon an attempt to remove the teeth. Refusing to be placed under the influence of an anæsthetic, as each tooth left its socket she exclaimed that a thick cord was being torn from her spinal marrow. All the defective teeth were extracted, and the medicines discontinued; a subsidence of every unpleasant symptom rapidly ensued; the pain and spasms, leaving the region of the spine, were, for a short time, transferred to the muscles of the throat, but rhythmical action soon taking the place of discord, she now, after the lapse of five months, reports herself as entirely restored to health, and able to endure the most severe exercise without fatigue. For three months the tissues covering the alveoli were disposed to suppurate, discharging sanguinolent matter. A perfectly healthy condition of the mouth is now presented, and the patient expects, after the introduction of an artificial denture, to be entirely rejuvenated.

This is one of the many cases wherein a knowledge of dentistry as a specialty enables the physician to trace a cause of trouble to the great nervous centres, and although his treatment for a time may be such as will only meet the present prominent symptoms, he is able in the end to remove the cause, fully satisfied that the old dogma, so oft repeated, is a true one, and that the effect will cease.

ACONITE POISONING.

BY EDGAR PALMER, LA CROSSE, WISCONSIN.

I BEG leave to record the following sad death from aconite poisoning, which you are at liberty to publish at your discretion, as a warning to those of our profession who are not awake to the dangers attendant upon a careless administration and use of this deadly poison.

Mr. Adelbert Moeller, a druggist of this city, highly respected both as a citizen and business man, when about to close his store on the evening of the 6th ult., repaired to his back store for the purpose of taking a glass of brandy. One of his clerks, in obedience to advice from me, had been using from a bottle of aconite (tinc. from root), and carelessly left it near where a similar bottle, containing brandy, usually sat. With equal carelessness Mr. M. poured from this bottle about an ounce of the tincture, and instantly passed it into his empty stomach. An insufferable burning sensation in his throat caused him to look at the bottle, which revealed to him his danger. An emetic was taken, but five, and perhaps ten minutes must have been lost by delay, looking for an anti-

dote, before the contents of the stomach were evacuated. Encouraged by the prompt and powerful effects of the emetic, he went cheerfully to his residence, feeling only a slight depression, as might have been expected.

The anxiety of his family brought medical aid, which proved of no avail, for he died in about three hours from the time he took the fatal draught.

About half an hour before he died the first positive symptom of poisoning presented itself in the form of a chill, with trembling in the lower extremities, followed by weakness, fainting, complete prostration, and death.

How much has been written on the care necessary to prevent injurious results from the application of arsenic to destroy the tooth pulp! and yet we seldom dispense more of this poison than we leave in the cavity of a decayed tooth, while drachm vials of this equally poisonous drug, fifteen and even twelve drops of which will destroy life, and to neutralize which I know no antidote, go out of our offices unlabeled, and find their way into family circles who live in blissful ignorance of its true nature, unless some one fall a victim to it.

If this hastily-prepared article opens the eyes of any who, like myself, have been carelessly dispensing this remedy, perchance a similar fate may be spared another, and this report be not in vain.

REPLACEMENT OF TEETH.

BY J. B. DA CAMARA, NEWARK, N. J.

I HAVE noticed several statements in the DENTAL COSMOS lately upon the replacement of teeth after extraction. An article from G. E. Corbin, M. D., St. John's, Mich., criticising (and I think very deservedly) a statement made in the July number by C. L. Eades, in relation to *replacing drawn teeth*, induces me to mention a case which occurred in my practice in July, 1867. A gentleman called at my office for the purpose of having the first and second right inf. molars removed. Upon examination I found deep cavities in each, exposing the pulp; one in the posterior approx. surface of the *first* molar; another in anterior approx. surface of second molar, small in diameter and just beneath the edge of the gum. The only method of reaching the cavities which presented itself to my mind, was by cutting *down* from the masticating surface; this I proposed to do, but he had been suffering so intensely that he would listen to no argument I could advance to induce him to have the pulp destroyed and teeth filled. Under the influence of nitrous oxide gas I extracted them; instead of diverging, the fangs grew to-

gether, forming *one straight root.* The thought struck me that I might fill and replace them. When he had recovered from the effects of the nitrous oxide I proposed to him the above; upon my assuring him it would cause no pain, he consented. After cleansing the cavities, *and removing the pulp,* I filled them with amalgam (fearing a gold filling would require too much time), syringed the sockets with tepid water, and replaced the teeth—directing the patient to call next day. On Monday he called, complaining of a little soreness and stiffness on that side of the face, for which I prescribed. I heard nothing more of him for nearly six months, when he assured me they were as serviceable as any teeth in his mouth. He had had no trouble with them, and I found them in a very good condition. The teeth are there now.

I am not at all desirous that the profession should understand I advocate such a course whenever a difficult operation presents itself. I hereby relate it as one of those unusual occurrences in our profession which impress themselves upon our minds, and are sometimes in an indirect manner productive of much good.

PROCEEDINGS OF DENTAL SOCIETIES.

ODONTOGRAPHIC SOCIETY OF PENNSYLVANIA.

BY T. C. STELLWAGEN, M.D., D.D.S., PHILADELPHIA.

TUESDAY, October 6th, 1868, the stated monthly meeting was held in the Philadelphia Dental College. Prof. McQuillen, the President, in the chair.

A large attendance, and the expression of a determination on the part of many of the members to take a more active interest in the proceedings during the coming winter, together with the anticipated agitation of the questions involved in the formation of the Constitution and By-Laws of the proposed State Association, all seem to point to the conclusion that we are about to enter upon a new, and it is hoped that it will prove a most useful era for dental surgery in our State. Certain it is that only by intelligent and united labor in the right direction can any positive advancement be predicted for the profession at large. The advantages offered by associations, composed of energetic, thinking men, are, to an enlightened community, evident from the well-known benefits arising from a free and courteous interchange of different or opposite opinions.

Several nominations, of gentlemen well known for their professional skill and ability, were made.

The importance was urged of making it more generally understood, that the Odontographic Society is composed of students of our science, who are ever pleased to see at their meetings, either as members or visitors, men who, like themselves, desire knowledge; recognizing that every one who has performed even the most simple operation in dentistry can contribute to the stock of knowledge, and show something worthy of admiration.

After the reading of the minutes, a specimen of a molar tooth, with a calcified pulp, presented by Dr. Rising, of Illinois, was shown by the President, not only on account of its merit as a highly interesting specimen for the museum, but as well to call attention to the important aid that members of the profession all over the country could give to the advancement of science by forwarding anatomical or pathological specimens to the local societies, where they could be preserved in the museums, and be used to great advantage in illustrations of essays, lectures, discussions, etc.

Prof. Kingsbury stated that for some six months past he had been pursuing a new method in the treatment of exposed pulps, with the view of retaining their vitality. The preservation of the pulps of teeth, especially of the oral teeth, is an attainment of the first importance. When a tooth is deprived of its pulp its vital force is greatly diminished, and consequently its power to resist the action of those agents which act as exciting causes of decay is proportionately weakened; not only so, but the tooth loses that peculiar translucency and pearly brilliancy which distinguish the *living* from the *semi-dead* organ, and it is *liable* to become dissolved. He valued as highly as any member of the profession the operation for the devitalization of the tooth-pulp when necessary, the treatment of the pulp cavity, and filling with gold. The saving of teeth, even in that way, was a great advance in dental practice. Yet there were so many unpleasant consequences occasionally resulting from this treatment of teeth affected with complicated caries, that for a long time he has regarded the death of the pulps of teeth as a great calamity. It is an easy matter to destroy the pulp; not so easy to save it. He had for a long time been investigating this subject, and seeking to discover some treatment for the preservation of the pulp as practicable and reliable as the treatment for its devitalization. He was not prepared to state that he had as yet fully realized the object of his desire—the goal of his professional ambition. But he fully believed it within the range of possibility, within the unfoldings of dental pathology, within the reach of the earnest and persevering student of dentistry.

He was aware that many efforts had been made in this direction by able minds, and much had been said and written on this subject. Some had even flattered themselves that they had found the long-sought

philosopher's stone, which has the power to transform whatever it touches, not to *gold*, but to *dentine*. He had in years past tried the various materials for capping exposed pulps. He believed that he had exercised great care in his operations, and in numerous cases the results had not proved satisfactory. He had within the last year used oxide of zinc, or *osteo-dentine*, but in most of the cases it had disappointed the expectations which the reported success of others had excited. Some of the cases treated by other dentists had come under his inspection, and he had found the pulps dead, and the teeth had become subject to periodontitis and alveolar abscess.

Having had an experience in the use of the various substances for capping exposed pulps which have claimed the attention of dentists for the last twenty years, among which he would mention gold, tin, lead, Hill's stopping, quill, horn, shell, oil-silk, collodion, osteo-dentine, plaster of Paris, etc., he had come to the conclusion that pure metallic lead in proper form was, in some respects, better adapted to this purpose than any other known material. He remembered that, while a student, he found in one of his text-books, S. S. Fitch's *System of Dental Surgery*, a suggestion that the use of lead pivots inserted into the prepared roots before the teeth were permanently pivoted would, by the therapeutic action of the lead, allay any existing periosteal irritation or inflammation. Whether there was much value in the suggestion, for the purpose for which it was made, he had not had occasion to prove. It is a well-known fact that of all the metals, if not of all the hard substances with which we are acquainted, there is not one that seems to be so congenial to vital tissue as lead, while some of the preparations of lead have been used for a long time as the most efficacious therapeutic agents in topical applications to counteract inflammatory action. It is a well-known fact that metallic lead, in the form of shot, slugs, and bullets, may be found deeply imbedded in the different tissues of the human organism, received as uncoveted mementoes of our late conflict by thousands of our own brave soldiers, which are carried as inseparable companions without the slightest inconvenience. A case was reported not long since by Dr. Wurtz, of New York, in which an ounce bullet was found, on dissection, in the middle lobe of the right lung of an old soldier, forty-five years after its introduction, at the siege of Badajos. The fact of so large a piece of lead becoming encysted in vital tissue of such delicate structure as the human lungs without doing harm, proves the non-exciting and innocuous influence exerted by the metal upon the most sensitive and vital tissues of man.

Such, gentlemen, are some of the considerations which have led me to institute a series of experimental operations in the capping of exposed pulps with lead. Having been convinced long ago that success in

capping required that there should be no vacuum or space between the cap and the pulp, and consequently that the material forming the cap should be closely adapted to the pulp and adjacent parietes o fthe cavity, about six months since he had a book of pure lead foil manufactured by an experienced gold-beater. He prepared caps of this foil by taking a piece one or two inches square, according to the size of the cavity of decay, folding it smoothly upon itself, forming the cap of suitable size and thickness. After preparing the cavity, using special care not to wound the pulp so as to cause it to bleed, avoiding the use of any of the ordinary therapeutic applications, such as creasote, spirits of camphor, chloroform, etc., he simply syringed with clear, tepid water, of about 100° of temperature, and afterward dried the cavity thoroughly with pellets of bibulous paper. He then placed the cap over the pulp, adjusting it with a blunt-pointed instrument, and filled over this, in some cases, with "Hill's stopping," but in most with pellets of gold foil, No. 4. This operation had been followed occasionally with slight pain, which subsided in a few hours.

Up to the present time every case thus treated had proved a success, and the patients have expressed themselves in terms of great satisfaction. The time that had elapsed did not warrant him in being too sanguine, or in expressing himself too confidently in favor of a branch of dental practice in which there had been so many signal failures and bitter disappointments on the part of many eminent operators.

When he arose, he had no intention of taking up so much of their time, but the subject was to him one of great interest, and he felt that it should be so regarded by the profession generally. He would commend the treatment he had pursued to their consideration, and hoped it would be found to stand the tests of experiment and time.

Dr. Tees believed that saving exposed pulps was a very important practice. Two or three years ago, at a meeting of the Society, when the subject under consideration was "destroying nerves and filling roots," he was the only one to recommend it. He applied creasote on a pledget of cotton to the exposed pulp; filling over it with osteoplastic, until about six months ago, when having read of Dr. Atkinson's treatment with creasote alone, considering it better than that of cotton and creasote, he since used the creasote without the pledget of cotton.

The creasote* he employs is very pure, and clear as crystal; it is dropped upon the exposed pulp by means of a broad plugger, then covered with soft osteoplastic, and with pieces of muslin about one-half inch square, pressed over this, the superabundance of chloride of zinc is absorbed, causing it to harden much sooner.

* A solution of carbolic acid, probably.

With but one exception, he has had no failure. This was a cavity on the posterior surface of an inferior molar, which he treated in this way, and then filled over with amalgam; it being his habit to fill over the osteoplastic with gold or amalgam, the former in the majority of instances. The patient returned in a few days, and thinking that the pain might be produced by the amalgam impinging upon the periosteum, he filed it off. The patient has not since returned. He has two teeth in his own mouth thus treated, with nerves nearly exposed, which would not bear the pressure of the gold in filling; he has no pain, and the pulps give indication of still being alive.

Dr. Breen was much pleased with the preceding remarks on the efforts made to save the pulp. In diagnosing he was careful to ascertain the amount of pressure that the membrane would bear immediately over the pulp, without causing acute pain; if not acute, he invariably treats with creasote, and fills with gold, the majority of such cases being satisfactory; if acute, he devitalizes with nerve paste prepared according to the usual formula, extirpates, and treats the roots with creasote for from four to six days, first washing out with dilute tinct. myrrh. If, at the return of the patient, there be no pain on inserting the broach, he introduces a pledget of cotton, saturated with creasote, and fills with gold. In February, 1859, he treated four inferior teeth (two cuspids and two bicuspids); two weeks ago he saw the patient, and up to that date they were giving satisfaction.

Dr. Nones caps with a concave gold plate; he proposes to try lead foil in a tooth where gold had failed, as was his experience in a majority of the cases thus treated. Although he had had success in capping with the plate, he used Hill's stopping, which acted as a non-conductor, to cover the cap; he did not complete the operation for a day or two.

Prof. Kingsbury thought the concave caps an old thing; he was satisfied any treatment, to be successful, requires a close contact of the cap with the pulp; otherwise it swells or effuses lymph into this vacant space, and the pulp becomes lacerated by sharp edges of the cavity. After having applied the lead cap, he believes that in some cases to fill over with Hill's stopping is advisable, so as to have a good non-conductor. He thought any caustic a destroyer of the pulp.

Dr. Tees suggested that the escharotic properties of the chloride are destroyed by the oxide of zinc.

Prof. Kingsbury thought that after mixing it had an extremely caustic character, as it would destroy the portion of pulp in contact with it, and cause it to slough.

Dr. Tees never saw it act so, although in a number of cases he had used it.

Dr. Long had tried it, but with so little success that he seldom thinks it worth running the risk.

Dr. Head felt certain that the oxychloride of zinc acted as an escharotic, at least until perfectly set; he had used it for obtunding sensitiveness in dentine, by leaving it in the cavity from two to seven days. In most cases the sensibility was sufficiently diminished to admit of excavation without pain.

Prof. Kingsbury had considered this subject in its various bearings. Lead had been used for a long time for filling teeth. It was for half a century the principal material used by the French dentists. At the present time the term used in France for the operation of filling a tooth even with gold is *plombage*, signifying literally the leading of a tooth, derived from the early use of this metal. The lead foil soon oxidizes. He thought, perhaps, this very condition of the foil might be favorable just as the oxide of tin seems to exert a decided therapeutic effect in some cases on sensitive dentine to obtund sensibility and arrest dental caries.

Dr. Stellwagen desired that no one should think that he opposed proper efforts for the salvation of a useful portion of the human frame—most particularly this delicate pulp tissue that furnishes so great an amount of the vitality of those important organs, the teeth, which, as dentists, we are especially called upon to preserve in as nearly a normal condition as possible. He might be looked upon as giving vent to speculative or even chimerical opinion, for asserting that he hoped the day would come when they would be able to cause by some means an exudation of material which would fill with secondary dentine the cavity of decay. The well-known plasma of the blood that forms the cicatrix uniting the soft tissues, or the provisional callus that performs the same office in the osseous structure, when either or both have been separated from their relative positions by the solution of continuity, may be taken as an excuse for the suggestion, if not an actual assurance, that such a power may exist, although latent, in some of the dental tissues. Nay, he would even go further, and state that he confidently looked forward to the time when the dentist, by his care of the teeth of the present and coming generations, together with his faithful and able performance of the duty of enlightening his patients and the community at large upon the necessity and means for preventing disease in these organs and their surroundings, shall have accomplished his highest mission, the prevention of disease, and become the oral surgeon, if such practitioners are still needed, which he hoped they will not be.

Two questions always present themselves to his mind on hearing or reading a discussion upon the subject of preserving exposed pulps. *First*—has a correct diagnosis been made in the reported cases of suc-

cessful capping over *exposed* pulps? *Second*—do the teeth, in the cases reported as satisfactory, last long enough, or are the life and utility of the teeth sufficiently preserved to warrant the exposure of the patient to the pain of the treatment and the agony which so often results from a failure?

The first question did not seem to require any time spent upon it here. Granting that the gentlemen advocating this practice could and always did follow the approved processes for correctly diagnosing the condition of the pulp, he would pass to the second point, which involved much more skill in forming a prognosis, requiring, as it does, a thorough knowledge of the various temperaments, diatheses, and idiosyncrasies, which must be taken into consideration, and he felt quite sure that few, who have a due regard for their reputation, would undertake to predict, upon information which is at best liable to so many errors from various causes, an invariably happy result. For his part, he had tried the methods spoken of, and met with but little success. He hoped that some one would give a full statement of practice in this direction, reporting (as it seems most difficult to do) every case attempted, and how many were successful; the number that were painful or troublesome, and those that required the removal of the filling or tooth to relieve the suffering. He had a most acute and lively recollection of such a filling in one of his teeth, which, although some might consider its failure due to want of care, or diseased action that might have possibly occurred if the tooth had been sound, he had always felt that it was a suspicious case, and worthy of very serious consideration. If any advocate of capping nerves had suffered as he had done with this one, he doubted not that it would have been a lesson, having a wholesome effect in cautioning the operator to be in no manner fearful of taking too long to decide upon the merits of the practice, before running the risk of subjecting his patients to the same trial.

Some ten years ago he had a bicuspid tooth thus treated, from which an old gold filling had been removed, and the nerve was nearly or quite exposed. In this case, a piece of thin quill, softened by moisture and heat, had been laid over the floor of the cavity (which had been previously washed out with warm water and dried); while pliable, this non-conductor was pressed into close proximity with the dentine under it, and covered with a solid gold filling. The success of the operation for three or four years seemed to warrant the practice; but, while he was at sea in the United States navy, he was awakened to a sense of its condition by an uneasiness about the tooth that soon enlightened him, by practical personal experience, as to what a toothache is when no dentist is at hand to relieve it. Too well he yet remembered the merciless thumping, grinding, burning, agony of

agonies, that he suffered for three whole days before he decided to extract it, or get an engineer to knock it out with a cold chisel and hammer. Fortunately the former was accomplished, and he drilled open the little pest, and was almost sickened by the pent-up gas from the putrescent pulp within, which, the Utica of a pulp cavity no longer confining it, seemed to rush out with an almost audible puff.

Language could not fairly portray his feelings—nothing but similar experience; and he leaned to the belief that, had he not been a dentist himself and thus well aware that it was not the fault of the practitioner, he would have probably condemned the whole fraternity.

Dr. Eisenbrey said his practice was to cap, or rather protect, nearly exposed pulps with sheet gutta-percha dipped in chloroform, so that it may be better adapted to the inequalities of the cavity; then he packs the gold firmly around the margin of the gutta-percha, using less pressure immediately over the pulp until the cavity is half full; he then finishes as in ordinary cases. Where a pulp is fully exposed, he doubts the advisableness of capping (even with lead foil), for trouble is apt to supervene at the end of *three years*, if not *sooner*, as instanced by the Recording Secretary in his personal experience. The doctor felt it to be true that leaden bullets have been carried in the bodies of men for years, without their experiencing any marked inconvenience, after being encysted; but he had his doubts if there was ever one encysted in actual contact with the *body* or *visible* branch of as delicate a structure as a nerve; while in the case of a pulp the cap is in actual contact with it, which contains filaments of one of the most susceptible branches of the nervous system. Granting that a ball has been encysted in contact with a nerve, we have the advantage of yielding tissues and a large surface for the resultant swelling from the irritation induced; while, on the other hand, we have the walls of the teeth and alveoli, and the impossibility of making satisfactory treatment; hence we have death of the pulp from the long-continued inflammation and abscess consequent upon suppuration.

When fully convinced that a pulp is exposed, he destroys, and, so far as possible, removes every trace of it. At the proper time he stops the roots with cotton and creasote, to prevent the decomposition of the remaining (if any) pulp tissue. He then caps the canals and fills the pulp cavities with oxychloride of zinc, believing it to be better than gold, effectually protecting the tooth from thermal changes, which frequently cause periodontitis, the distance from the pulp cavity to the periodental membrane being so short. He spoke from experience of the good office it performs, having had the left inferior six-year molar treated and filled in that way. When he rises in the morning he does not feel disposed to utter the oft-repeated complaint: "Doctor, my tooth feels longer than the rest, and more particularly when I have a cold in my head. What is the cause of it?"

Water, at 32° and 120°, affect it alike painlessly. It is so satisfactory in his case, that with him it seems to be the *modus operandi* for molar teeth exclusively.

If the patient does not object to the price, he finishes the operation with gold; otherwise with tin foil. The reason he prefers oxychloride of zinc to Hill's stopping or gutta-percha, is that it makes a firmer foundation to work on, which is one of the essentials for a solid filling.

Prof. Kingsbury, in regard to the Recording Secretary's remarks, felt that capping the nerve would permit it to throw out secondary material, and the nerve itself would retract and calcify. In a number of cases he had found this to have taken place under tin foil fillings, which had permitted this to go on, and at the same time protected the tooth.

The shrinking of the pulp and its calcification he looked upon as a normal physiological action. Sometimes it is caused by some degree of irritation—as in the case presented this evening, it no doubt was abnormal.

Dr. Nones, in filling the canals of teeth, had tried pure white wax in the incisors, using instruments not too much heated, and pressing it up while soft.

Prof. Kingsbury asked if paraffine, one of the products of petroleum, might not possibly prove to be the very material required.

Prof. McQuillen said his experience and that of others in whom he had great confidence had dampened his ardor in the effort to save exposed pulps. He had observed that, owing to the transmission of thermal influences by large and well-consolidated metallic fillings, when a thin portion of dentine only protects the pulps, the latter frequently inflame and die. Gentlemen whose integrity he could not question have reported successful cases of treatment of the pulp to him. That they may have been mistaken, however, as to the result, is possible, for pulps sometimes die and dry up, without causing any disturbance for years.

The proposition to employ lead as a capping for exposed pulps, was new to him, and he should watch future developments in its use, with much interest. The tolerance of lead in the organism of man was a well-established fact, and certain preparations of lead were very useful also as remedial agents; on the other hand, it must be remembered that some of its compounds are quite poisonous, painter's colic and lead palsy following its introduction into the system. No results like these, of course, could attend the use of the metal as proposed. It was only a matter of question whether thermal changes would not exert their baneful influence on the pulp.

In speaking of variations of temperature, he was reminded of the fact that in the application of the same amount of heat to different substances, the amount of expansion or contraction is quite different.

Thus, a compact gold filling and the dentine of a tooth, when subjected to the extreme changes of temperature, too often practiced in this country, of taking at one moment food so hot that it almost burns the mouth, and the next minute a glass of iced water, there must be a marked difference in the alteration of the bulk of the two, in some instances, doubtless, producing, to a certain extent, a forcing of the filling out of the cavity. He had been impressed with this conviction in looking to-day at a very beautiful filling, introduced some five or six years ago by a prominent and skillful operator in the West for a fellow-practitioner. The filling was perfect in every respect, with the exception of a slight projection at the margin of the cavity that had recently attracted the attention of the patient, and which he attributed to this cause. The more dense the gold the greater the variation. This, however, is no argument against compact fillings, nor are these remarks made as a shield for the loosening and dropping out of imperfect operations, but merely directing attention to interesting phenomena.

Dr. Long had lately extracted the root of a central incisor tooth, which was filled a few years ago with cotton and camphor; upon removing the gold cover he found the pulp cavity sweet and clean, with some trace of camphor. Some time previous he had removed a root that had been treated with creasote, and although free from all odor, it was pure and fresh.

Prof. Kingsbury agreed with the views advanced with regard to the action of heat and cold, and wished to be understood that, although the finest and most dense fillings are most subject to this action, yet this should not be considered as justifying any carelessness in condensing fillings.

Dr. Nones presented the following resolution, which, being duly seconded, was carried without a dissenting voice:

Resolved, That, with the view of increasing the contributions to the museum, a curator be elected, whose duty it shall be to take charge of, and keep an accurate record of all specimens presented to the Society, with the names of the donors.

Dr. Nones being nominated as curator, *pro tem.* (to serve until the constitution and by-laws could be amended), was unanimously elected.

The Society then adjourned.

AMERICAN ACADEMY OF DENTAL SCIENCE.

The annual meeting of the American Academy of Dental Science was held on Monday afternoon, September 28th, at 3 o'clock, in the rooms of the Suffolk District Medical Society, No. 12 Temple Place, Boston, Mass. Dr. E. T. Wilson presided, and Dr. E. N. Harris acted as secretary. A

business meeting was held at 3 o'clock, at which the following officers were elected for the ensuing year:

President.—Daniel Harwood, M.D.

Vice-President.—E. T. Wilson, M.D.

Secretary.—E. N. Harris, D.D.S.

Treasurer.—E. G. Tucker, M.D.

Librarian.—John Clough, M.D.

Censors.—E. G. Tucker, M.D.; D. M. Parker, M.D.; J. L. Williams, M.D.

The annual address was then delivered by E. T. Wilson, M.D.

Dr. Wilson, in welcoming the gentlemen present to the hospitalities of the occasion, congratulated them upon the renewal of the many privileges and pleasures which the anniversary proffered. It was good, he said, for the devotees of a common pursuit, the professors of an important and useful science, the cultivators of an ingenious and beautiful art to gather together, that each may compare his own experience with that of his fellow, and may communicate in a spirit of professional courtesy whatever of useful novelty may have fallen under his observation. Dentistry has been created as a science almost in our own day, and no liberal pursuit, partly practical and partly theoretical, has made more rapid advancement. This wonderful progress, which is admitted by everybody, was made under the most discouraging difficulties, and it has been owing to patient study, shrewd observation, tireless manipulation, and cautious and intelligent experiment. The profession has now status, respectability, cultivation, knowledge, experience, and a literature of its own; and it has not for many years been deficient in facilities for a thorough practical education; nor has it more than its fair proportion of quackish parasites. There has been 'pathy upon 'pathy, but there has been no 'pathy introduced into dentistry except the amalgam 'pathy, which is destined in the future to open a large field of practice to those medical men who are thoroughly versed in counteracting the effect upon the human system of all mercurial compounds, such as are used at the present time by many dentists. There has been no method devised thus far of extracting teeth by an infinitesimal turn of the wrist, or of plugging them by inserting the decillionth of a grain of gold. We have dextrous and we have clumsy operators, but some kinds of work we all admit it is necessary to do, and when we have made a botch of it we are not permitted to hide our failure in a cemetery, for it keeps walking about, grinning horribly a ghastly smile, and advertising our incompetency to all beholders. In closing, Dr. Wilson dwelt upon the necessity of maintaining a high standard of professional character and dignity, and spoke hopefully of the success which the profession is destined to attain in the future.

Dr. Daniel Harwood, of Boston, was appointed by the Academy to deliver the next annual address.

The anniversary dinner was served at the Revere House in the usual excellent style. Dr. E. T. Wilson presided. The Rev. George D. Johnson, Rector of St. Mark's Church, offered prayer. After discussion of the bill of fare, speeches were made by His Honor Mayor Shurtleff, Dr. Harwood, the Rev. Mr. Johnson, Dr. J. H. Foster, of New York; Dr. H. F. Bishop, of Worcester; Drs. E. G. Tucker, J. L. Williams, B. S. Codman, C. H. Frothingham, of Boston, and others.—(*Boston Advertiser.*)

CUMBERLAND VALLEY DENTAL SOCIETY.

BY GEO. W. NEIDICH, CARLISLE, PA.

A MEETING of the members of the dental profession of Cumberland and the adjoining counties was held at Carlisle, Pa., on the 16th of October, 1868, for the purpose of forming a society to represent and advance the interest of the profession in the Cumberland Valley. The following gentlemen were present: Drs. J. L. Suesserott, H. Forrest, W. B. Haycock, Chambersburg; T. D. French, Waynesborough; Jno. A. Hatton, Greencastle; J. C. Miller, Mechanicsburg; C. S. Murray, Newport; S. A. McDowell, Geo. W. Neidich, H. W. Caufman, J. C. Neff, T. Neff, Carlisle; and letters were received from Drs. J. W. Moffitt, Harrisburg; W. B. Shoemaker, Newville; J. L. Hill, Gettysburg; Geo. S. Searight, Carlisle.

Prof. J. L. Suesserott was chosen chairman, and Geo. W. Neidich secretary, *pro tem.* A constitution was submitted by the secretary, which was, after being amended, finally adopted, and the society organized as THE CUMBERLAND VALLEY DENTAL SOCIETY.

The following officers were elected for the ensuing year:

President.—Dr. J. L. Suesserott.

Vice-President.—Dr. J. W. Bender.

Secretary.—Dr. Geo. W. Neidich.

Treasurer.—Dr. J. C. Miller.

Executive Committee.—Drs. T. D. French, H. Forrest, J. C. Neff.

The worthy president, on taking his seat, made some very pertinent remarks on the advantages of association, and exhorted his fellow-practitioners to lay aside all personal animosities and jealousies; to forget self, and have only in view the elevation of our professional character; to not be a receiver only, but for each of us to contribute something to our dental literature. The greatest enthusiasm and zeal was manifested by every member present.

The delegates elected to the proposed State society to meet in

Philadelphia, on the first Tuesday in December, are Drs. Suesserott, Haycock, Neidich, and Miller.

On motion of Dr. French, of Waynesborough, the dental profession of Hagerstown are invited to unite with us.

As our meeting was almost wholly occupied in organization, we had no time for discussions, essays, etc., but in time we will have them. We meet semi-annually.

On motion, adjourned to meet in Chambersburg on the evening of the second Tuesday of January, 1869.

PENNSYLVANIA STATE DENTAL CONVENTION.

In pursuance of notice previously given to the several dental associations throughout Pennsylvania, in relation to securing *legislative action* to regulate the practice of dentistry in the State, there will be a meeting of delegates held in Philadelphia, at the Philadelphia Dental College, N. W. corner of 10th and Arch streets, on Tuesday, December 8th, 1868, at 10 o'clock A.M., for the purpose of forming a *State Dental Society.* We cordially invite all dental associations throughout this State to send representatives, in the proportion of one to every five active members, to the Convention.

Committee of Litiz Convention.—Jno. McCalla, D.D.S., S. H. Guilford, D.D.S., Wm. Nichols Amer, W. H. Scholl, D.D.S.

Committee of Odontographic Society.—T. C. Stellwagen, D.D.S., W. P. Henry, D.D.S., Wm. A. Breen, D.D.S., Chas. M. Curtis, D.D.S.

Committee of Pennsylvania Association of Dental Surgeons.—James Truman, D.D.S., T. L. Buckingham, D.D.S., Edwin T. Darby, D.D.S.

Cumberland Valley Dental Society.—J. L. Suesserott, D.D.S., Chambersburg; W. B. Haycock, Chambersburg; Geo. W. Neidich, D.D.S., Carlisle; J. C. Miller, Mechanicsburg.

SUSQUEHANNA DENTAL ASSOCIATION.

BY J. M. BARRETT, WILKESBARRE, PA.

The Susquehanna Dental Association held its semi-annual session at Scranton on the 15th of July last.

The following were elected officers of the Association for the present year, viz.:

C. S. Beck, M.D., President; J. L. Fordham, D.D.S., Vice-President; J. M. Barrett, Recording Secretary; R. E. Burlem, Corresponding Secretary and Librarian; J. L. Andrews, Treasurer.

Executive Committee: Drs. Renn, J. Locke, and B. F. Wallerchamp.

Addresses were delivered before the Association by the retiring President, Dr. H. Gerhart, and by Dr. C. S. Beck, President elect, on taking the Chair; and an essay on "Saving the Teeth" was read by Dr. J. M. Barrett.

Interesting discussions on various subjects were participated in by the members generally, and, among other resolutions, the following was unanimously adopted:

Resolved, That, in view of the legislation obtained in several other States, this Association will most heartily co-operate with other dental associations in any effort that may be made, with a view to securing legislative action, which shall define the qualifications of practitioners of dentistry in this Commonwealth.

The Association adjourned to meet at Lewisburg, on Wednesday, the 13th day of January, 1869.

MERRIMACK VALLEY DENTAL ASSOCIATION.

The annual meeting of the Merrimack Valley Dental Association will be held in the Common Council Room, City Hall Building, Manchester, N. H., on Thursday, November 5th, at 10 o'clock A.M.

Essayists—Dr. W. H. Noyes, of Newburyport, and Dr. L. D. Shepard, of Boston. Subjects for discussion: "Plastic Gold;" "Alveolar Abscess;" "Plastic Materials for Filling Teeth, other than Gold;" "Materials for Base for Artificial Teeth."

All respectable practitioners of dentistry are invited to be present and unite with the Association. G. A. Gerry, *Rec. Sec'y.*

AMERICAN DENTAL ASSOCIATION—NOTICE.

Members of the American Dental Association who have not paid their annual dues for 1868 are requested to remit at once to the Treasurer, that he may be able to meet the requirements of the Publishing Committee in defraying the expenses of issuing the Transactions.

Wm. H. Goddard, *Treasurer*,
Corner of Fourth and Green Streets, Louisville, Ky.

October 22d, 1868.

MUSEUM OF THE ODONTOGRAPHIC SOCIETY.

Having been elected Curator of the Odontographic Society of Pennsylvania, and recognizing that a large number of the profession, at home and abroad, have in their possession interesting specimens which are kept and shown as mere objects of curiosity to patients and a few fellow-practitioners, and then after a shorter or longer period are lost or thrown away as rubbish, which, if deposited in a public museum, would not only be preserved, but, in addition, prove of great service in the ad-

vancement of science by increasing the facilities for study, I take advantage of this opportunity to say that I should be pleased to receive such specimens, anatomical, pathological or microscopical, either as donations to the museum—when a due record of the specimens, and the names of the donors, would be made in the published transactions of the Society—or when parties attach so much value to specimens as to be unwilling to part with them, if forwarded to me with that statement, they would be carefully returned, after having been exhibited to the members of the Society. New instruments and other improvements in operative and mechanical dentistry, sent to me, would be promptly brought before the Society, and thus aid in bringing them to the notice of the profession generally. Packages forwarded to the Society should be addressed,

J. J. Nones, D.D.S.
Curator of the Odontographic Society of Pennsylvania,
332 North 11th Street, Philadelphia.

EDITORIAL.

THE NEW DENTAL DEPOT.

The readers of the Dental Cosmos are well aware that the business interests of the publisher have never been obtruded upon its pages; and in presenting the subjoined extract from the *North American*, the editor feels assured that the high-toned relation which Dr. White has so long sustained to the profession will justify a departure from the established rule alluded to in an event of such importance as the erection of a structure, the symmetry and beauty of whose architectural proportions command the unqualified admiration of every passer-by, and which will stand not only as an enduring monument of individual ability, integrity, energy, and industry, but also of the importance and advanced position of the dental profession in America. J. H. McQ.

S. S. WHITE'S NEW BUILDING.

The assertion may sound somewhat extravagant, but it is nevertheless an undeniable fact, that the structure recently erected at the corner of Chestnut and Twelfth Streets by our esteemed friend, Dr. White, is one of the finest buildings of its kind in the world.

The necessity for larger accommodations, both for manufacturing purposes and sales-rooms, made the removal from the buildings previously occupied on Arch Street imperative, and has been the means of adding to the attractions of the city one of its noblest edifices. He may feel just pride that, while confessedly leading the world in his own depart-

ment of manufactures, he has devised and completed a building which, while it combines all the conveniences necessary for his immense trade, is also a monument to his business energy and unblemished reputation and an object of admiration to every beholder.

Approaching this vast structure, one is forcibly struck with its immense size, massive appearance, and the noble style of its architecture; a front of 44 feet on Chestnut Street, of pure white marble, a depth of 235 feet on Twelfth Street, and a height—90 feet to the cornice—overtopping the surrounding buildings, irresistibly arrest the attention of every passer.

The first floor has been leased for a term of years to the enterprising firm of Bailey & Co., jewelers, and has been fitted up by them in a style of surpassing magnificence. The basement is vaulted out beneath the pavement on the front, side, and rear, and contains the boilers, engine, furnaces, mills, forges, and a series of immense bins for storing materials, crude and prepared, and work-rooms for certain classes of work.

The second floor is the sales-room, and contains the counting-room, private offices, and the publication office of the "DENTAL COSMOS." It is handsomely fitted up, and provided with every convenience for the display of an immense stock of dental materials, and the dispatch of business. A wonderful variety and extent of stock, of every conceivable article used by the dentist, from the smallest hand implement to the costliest plush-lined chair, is here exhibited. It is approached from the Chestnut Street front by a beautiful flight of white marble stairs.

The entrance to the third, fourth, and fifth stories is by two stairways on Sansom Street, one for the male and the other for the female operatives. The third floor is divided into four rooms, and is devoted to the various processes of tooth-making; the fourth floor to the manufacture of dental instruments, and the fifth floor to preparing and putting up the various preparations for office and laboratory use, and for packing and storage.

Throughout the entire building every attention has been paid to the comfort of the operatives, the apartments being admirably ventilated and lighted, and warmed throughout by steam.

On the Sansom Street front is a lift operated by steam, extending from the fifth story to the basement, at all times in readiness to convey goods from one story to another, receive raw materials, and discharge the finished products of the establishment. In addition, at convenient places, three dumb-waiters convey light packages from the manufacturing departments to the sales-room.

Communication is made from the sales-room and offices to the various apartments by means of speaking-tubes, which traverse the building throughout. The whole building is fire proof; the walls are of immense thickness, and each floor is supported by compound wrought-iron

beams, that span the entire width of the building—with no columns to interrupt the view—and are calculated to upbear 155 pounds to the square foot. They are connected by tie-rods throughout the entire length of the building, spanned by brick arches, which are filled to the crown with concrete and mortar, over which are laid floors of Southern, or true yellow pine. The cornice is of galvanized iron, with iron supports, and, therefore, like the rest of the building, fire proof; the roof of iron framework, covered with tin.

The cost of the entire structure was about $400,000.

This magnificent establishment gives constant and remunerative employment to between two and three hundred people, and supplies four-fifths of the dental material consumed in the world.

Besides these warerooms, Dr. White has depots for the sale of his manufactures in New York, Boston, and Chicago, and agents in every principal city, carrying the name of Philadelphia enterprise throughout the habitable globe.

NITROUS OXIDE IN PROLONGED SURGICAL OPERATIONS.

There is a general impression on the part of the medical and dental professions, that while nitrous oxide is a very safe and reliable anæsthetis in the extraction of teeth, it cannot be used with advantage in extended surgical operations, on account of the transitory character of the narcosis induced by its inhalation. In addition, an apprehension is entertained by many practitioners that unfortunate results may supervene, if efforts are made to maintain prolonged narcosis with it. That these impressions and apprehensions are not well grounded, my experiments on animals have fully convinced me; and the following facts in relation to its employment in general surgery demonstrate most conclusively the efficacy and safety of the agent.

Prof. Carnochan, of New York, it is well known, has performed a number of capital operations on patients placed under its influence, who, as he recently informed me, were kept insensible from ten to twenty minutes. In the *Medical and Surgical Reporter*, February 10, 1866, he says: "Since my last letter in December, I have performed four more capital operations on adults, viz., one amputation of the thigh, one of the leg, the removal of a tumor from the side, and the extraction of a cataract, making in all, since last July, seven successful capital operations under the influence of anæsthesia produced by the nitrous oxide gas. I have also, during this time, used chloroform and ether in my operations, and my opinion in regard to the superiority of the nitrous oxide as an anæsthetic is still unchanged."

In his monogram on *Instructions in Nitrous Oxide*, from which the extract above has been made, Prof. Barker observes:

"When the operation is a protracted one, the inhaler should every few moments be removed, and the lungs well filled with atmospheric air, when the gas may be again administered without any interruption of the anæsthetic condition. In this manner a patient may be kept for a long time under its influence without difficulty or danger. I would here remark that the longest time that I have kept a patient under its influence was about twenty minutes, the operation being the removal of a scirrhous breast by Prof. Joseph Pancoast. I have several times kept patients ten or twelve minutes under its influence without any unpleasant results."

In connection with these facts I would add the following, handed to me by Mr. W. H. Jackson, a dental student of Quebec:

"In the month of June, 1868, I witnessed a long and painful operation, which lasted forty minutes, and was performed with the greatest success upon a patient, who was kept under the influence of nitrous oxide during that period, in the Marine Hospital of Quebec, Canada, by Drs. Landry and Catilier, assisted by Dr. Pourtier, dentist, who administered the gas. The operation was the amputation of the greater portion of the foot, gangrened from the effects of a severe frost-bite. The patient was unconscious during the entire operation. I was also present at the amputation of the thigh of a woman, by Dr. Martigny, of Quebec. The patient was placed under the influence of nitrous oxide gas, and kept in a state of insensibility for ten minutes, with the most happy results."

Other cases might be cited to prove that this agent has been employed with advantage in surgical practice, but these will suffice. The principal objection that can be brought with propriety against its general introduction into surgical practice is the difficulty attendant upon the transportation of the gas in bags from one place to another. The proposition, however, to liquefy it, if carried into effect, would remove this important difficulty. This communication has been written with the desire of seeing that done, of inducing, if possible, our surgeons to give the nitrous oxide a more extended trial, and of disabusing the minds of dental practitioners of the erroneous impression that prolonged narcosis under its influence is necessarily dangerous.

J. H. McQ.

STATE DENTAL CONVENTION.

In another portion of the magazine will be found a call for a dental convention to be held in Philadelphia, with the view of establishing a State Dental Association, to secure, if possible, legislative action, to regulate the practice of dentistry in the State of Pennsylvania. The propriety of this step is so evident and so fully recognized by the pro-

fession, that no argument is demanded to enforce it, and it is only necessary to impress upon our readers the importance of *prompt* action on their part, in calling together the local societies in the State where this has not been done, and appointing delegates, so that each society may be properly represented in the proposed convention. In some sections of the State there are no local societies, and, although the time is quite short, the practitioners of those regions, by coming together promptly, could organize societies there, and send delegates to the convention. The Cumberland Valley Dental Society, a report of whose proceedings appears elsewhere, was formed in this way, and affords encouragement to others to do likewise. It is earnestly to be desired that the profession throughout the State should take a warm interest in the movement.

J. H. McQ.

ANTIDOTE FOR ACONITE.

A DISTRESSING case of poisoning with aconite is published in this number of the magazine, by Dr. Palmer, of La Crosse, Wis., in the course of which it is stated that much valuable time was lost in looking for an antidote, without avail. This has led me to publish the following from Mitchell's Therapeutics; although, in a case like that, where so much of the poison had been swallowed, it is hardly probable that the antidote would neutralize it. Dr. Mitchell says:

"In the *London Lancet* for July, 1856, we find a paper on the poison of aconite, by Dr. Headland, which embodies all that is important on that subject. After stating cases to show how small a dose of aconite—viz., fifteen drops—has nearly proved fatal, he closes with a brief summary of the treatment. As soon as the poisoning is suspected a large quantity of animal charcoal should be administered. The aconite is quickly taken up and obstinately retained by this agent. Dr. H. thinks an emetic of zinc should be given after the charcoal, and not in the first instance. Then he advises the free use of brandy and ammonia."*

Aconite is so generally employed in the practice of dentistry, that there is a certain degree of carelessness in leaving it freely exposed on the instrument case, etc., by many practitioners. This is all wrong, and it should be a rule to have the bottle containing it labeled, "Poison." Indeed, such articles as arsenic, aconite, etc., should be kept under lock and key, except when being used. A proper regard not only for patients, but for one's own family, should induce care and discretion in this respect. Prevention is always better than cure.

J. H. McQ.

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* Materia Medica and Therapeutics, by Thos. D. Mitchell, M. D., p. 98.

PERISCOPE OF MEDICAL AND GENERAL SCIENCE IN THEIR RELATIONS TO DENTISTRY.

BY GEO. J. ZIEGLER, M.D.

"*Relation of Food to Work done by the Body, and its Bearing upon Medical Practice.*—Address delivered at the meeting of the British Medical Association at Oxford, by the REV. PROFESSOR HAUGHTON, M.D., F.R.S., D.C.L. Oxon., Fellow of Trinity College, Dublin.

"*Introductory.*—Man, like other animals, is born, grows, comes to maturity, reproduces his like, and dies; passing in his lifetime through a cycle of changes that may be compared to a *secular* variation, by a metaphor borrowed from the science of astronomy; while, in his daily life, he passes through a smaller cycle of changes that may be called *periodic.*

"From the time of the publication of Bichat's essay 'On Life and Death,' it has been admitted that man and other animals possess a double life, *animal* and *organic*, presided over respectively by two distinct, though correlated centres of nervous force; of these, one *thinks*, *moves*, and *feels;* the other merely *cooks*,—receiving the food supplied, changing and elaborating it into elements suitable for the use of the animal life.

"In the lower forms of animals, the organic life becomes almost coextensive with the whole being of the creature, which simply digests, assimilates, and excretes; but barely feels or moves. In the higher forms of animals, and more especially in man, the animal life dominates over the organic life, which becomes its slave, and it exhibits the remarkable phenomena of *mechanical force*, of *geometrical instinct*, of *animal cunning*, and, finally, in man himself, produces *intellectual work*, rising to its highest form in the *religious feeling* that recognizes its great Creator, and bows in humility before Him.

"It is a simple matter of fact, and of everyday observation, that all these forms of *animal work* are the result of the reception and assimilation of a few cubic feet of oxygen, a few ounces of water, of starch, of fat, and of flesh.

"The general question of the relation of food to work would involve a consideration of the possibility of throwing a bridge across the gulf that separates the organic from the animal life, so as to connect the products of nutrition (taken in its widest sense) with the work of every kind accomplished by the animal life, whether mechanical or intellectual.

"We resemble the spiders of the heather on a summer morning, that float their gossamer threads into the air from the summit of a branch, in the hope that some stray breath of wind may fasten it to a neighboring tuft, and enable the hungry speculator to extend the range of his rambles and his chance of food. Already a few feeble threads connect the chemistry of our food with the *mechanical work* done by our muscles; when these have been securely fastened, from the higher vantage-ground acquired, our little bridge of knowledge may possibly be extended to embrace the phenomena of the geometrical instinct of the bee, or the cunning of the beaver; and our successors may even dare to speculate on the changes that converted a crust of bread, or a bottle of

wine, in the brain of Swift, Molière, or Shakspeare, into the conception of the gentle Glumdalclitch, the rascally Sganarelle, or the immortal Falstaff.

"At present such thoughts would be justly regarded as the dreams of a lunatic, and I must crave your indulgence for having mentioned them. The history of science is, however, filled with such dreams; some never realized; others converted by time into realities so commonplace that the genius of their originators is habitually forgotten or underrated.

"During childhood and youth, the food that we eat is used for the double purpose of building up the tissues of the bones, the muscles, the brain, and other organs of the body; and of supplying the force necessary for work done, whether mechanical or intellectual. In adult life, the first use of food almost disappears, for the bones, the muscles, the brain, and other organs, have already reached their full development, and act simply as the media of communication between the food received and the work developed by it.

"Let us take, as illustrations, the muscles and brain, regarded as the organs by means of which mechanical and intellectual work is done. These organs resemble the piston, the beam, and the fly-wheel of the steam-engine, and, like them, only transmit or store up the force communicated by the steam in one case, and by the products of the food conveyed by the blood in the other case. The mechanical work done by the steam-engine must be measured by the loss of heat experienced by the steam in passing from the boiler, through the cylinder, to the condenser, and not by the loss of substance undergone by the several parts of the machinery on which it acts. In like manner the mechanical or intellectual work done by the food we eat is to be measured, not by the change of substance of the muscles or brain employed as the agents of that work, but simply by the changes in the blood that supplies these organs—that is to say, undergone by the food used, in its passage through the various tissues of the body, before it is finally discharged in the form of water, carbonic acid, or urea.

"The Divine Architect has so framed the animal machine, that moves and thinks, that the same blood which by its chemical changes produces movement and thought also repairs the necessary waste of the muscles and brain, by means of which movement and thought are possible; just as if the steam that works an engine were able, without the aid of the engineer, to repair the wear and tear of its friction and waste spontaneously; but no greater mistake is possible in physiology than to suppose that the products of the changes in the blood, by which mechanical or intellectual work is done, are themselves merely the result of the waste of the organs, whether muscles or brain, on the exercise of which that work depends.*

* The very skill with which provision is made for the repair of the waste of the organ used as the instrument of work may mislead the observer into supposing that the work itself may be measured by the waste of its instrument. Thus it has been shown by Mr. A. Macalister, that the heart, which has imposed upon it the necessity of working day and night without ceasing, during life, is furnished with double the usual supply of blood through the coronary arteries, which are injected twice for every single beat of the heart. If, indeed, it were possible to assume that all muscles wasted equally for equal quantities of work, and also to measure separately the products of that waste, we might then assume the waste of the organ as the measure of its work. Neither of these

"The ancients, who derived all their knowledge from observation, and not from experiment, were well aware of the double duty imposed upon food in early life—of producing both the *secular* and *periodic* variations of the body; or, in other words, of promoting growth, and of developing work. Their practical knowledge is summed up by Hippocrates in the aphorism—'Old men bear want of food best; next those that are adults; youths bear it least, more especially children; and, of these, the most lively are the least capable of enduring it.'

"The food consumed in twenty-four hours, including air and water, undergoes a series of changes of a chemical character before leaving the body, in the form of one or other of its excretions. Some of these changes develop force and others expend force, but the algebraic sum of all the gains and losses of force represents the quantity available for work. This work must be expended as follows: 1. The work of growth (*secular*). 2. The work of maintaining heat (*periodic*). 3. Mechanical work (*periodic*). 4. Vital work (*periodic*).

"During childhood and youth the work of growth is positive, for a certain proportion of the food used is employed in building up the tissues of the body instead of being expended in actual work; it is, in fact, 'stored up' in the body, as *vis viva* is stored up in the fly-wheel of machinery, and constitutes a reservoir of force that may be called upon at an emergency requiring sudden expenditure of force, or in case of illness, or in the gradual wasting of old age.

"In adult life, and in old age, the work of growth ceases completely, except so far as is necessary to repair, from day to day, the small wastes of the organs employed in work; so that nearly the whole of the food employed is expended on the *periodic* work of the body.

"Hence we can readily see the reason for the aphorism which asserts that food is more necessary for the young than for the old, and more required by those of a lively disposition, either of mind or body, than by others.

"*Hippocratic doctrine of innate heat.*—Hippocrates was well aware of the connection between food and animal heat, although he erroneously regarded the animal heat as an innate property of the body that caused an appetite for food, instead of being itself produced by food; if we transpose his cause and effect, *mutatis mutandis*, all his maxims as to animal heat are true. Thus, he says:

"'Growing animals possess most innate heat, hence they require most food; . . . . but the old have least heat, and therefore require the least fuel. The cavities of the body are naturally warmest in winter and spring; . . . . in these seasons, therefore, most food must be given; and since there is more innate heat, more nourishment is required; as may be seen in youths and athletes.'

"These maxims, when translated into modern language, express the well-known fact that the chemical changes of food that take place in the body produce animal heat, and that the necessity for food to supply mechanical work is greatest with the young and active, while the necessity for the production of animal heat is greatest in the cold seasons of the

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assumptions, however, can be admitted; for it can be shown that different muscles act under different conditions, more or less advantageously, so that equal waste would represent unequal works; and, also, it is impossible to separate in practice the products of waste of muscles from those of the general changes of the blood.

year. The direct connection of food with mechanical work is expressed in the following maxims:

"'There should be no labor where there is hunger,'—and its converse, 'Let labor precede meals.'

"On principles such as those just given, the training of the athletes was conducted; and they were compelled to undergo a regular course, commencing with blood-letting and active purgation, and consisting of systematic muscular exercise suited to the nature of the contest intended, accompanied by a dietary, of which the chief ingredients consisted of biscuits and pigs' kidneys, washed down by a minimum of water. It is, truly, not much to be wondered at that those who survived the training were formidable in the boxing ring or race-course.

"The relation of animal heat to respiration is referred to by Hippocrates in a remarkable maxim: 'Those persons have the loudest voices who have most [innate] heat, for they inspire the largest quantities of the cold air; and the product of two great quantities must be itself great.'

"Galen believed the heart to be the centre of 'innate heat;' but he was well aware that increase or diminution of respiration caused increase or diminution of heat, and was intimately connected with it. Thus he says: 'Since, therefore, the heart is, as it were, the hearth and fountain of the innate heat with which the animal is pervaded,' etc. 'The necessity for respiration is the greatest and most imperious guard of the innate heat.' 'Those persons in whom the innate heat had been much cooled breathe but little and slowly.'

"*Lavoisier's theory of animal heat.*—The doctrine of 'innate' heat, taught by Hippocrates and Galen, ruled in Medicine for 1500 years after Galen's death; until it received its death-blow from the genius of Lavoisier, who demonstrated in his celebrated memoir, read before the French Academy of Sciences in 1783, that the source of animal heat is to be found in the combustion of the carbon of the body by the oxygen of the air received into the lungs by respiration. Lavoisier's experiments were repeated and confirmed in 1822 by Dulong and Despretz; and have formed the starting-point for all modern investigations on the relation of food to work.

"As already stated, the work done by food in the body may be divided into the work of growth, the work of animal heat, mechanical work, and vital work.

"Lavoisier arranged his experiments so as to exclude almost all kind of work done, except that of animal heat. A guinea-pig was placed under a bell-glass inverted over a surface of mercury, and a current of fresh air was allowed to circulate through the apparatus, being passed at its final exit through tubes containing caustic potash, which arrested the carbonic acid produced by the animal. In this manner it was easy to ascertain the carbonic acid excreted, by the increase in weight of the tubes of caustic potash during the experiment." * * * *—(*Lancet.*)

"*Effects of Extreme Cold on Organic Function.*—Dr. RICHARDSON passed in brief review his experiments performed at Dundee in relation to the effects of freezing the centres of the nervous system. He showed that in the lower classes of animals, such as frogs, the nervous centres can be frozen for long periods of time, with recovery after entire unconsciousness and apparent death. The points added on this occasion were in continuation of this line of research. He first dwelt on the question

whether frozen animals—such as frogs—respire during insensibility, and explained that they did not. In proof of this, he said that animals so treated could be placed without harm in gases which would not support life, such as nitrogen and hydrogen, and could be recovered at the precise moment of solution from the frozen state when respiration was recommencing. He had placed animals in this way in hydrogen, nitrogen, and carbonic acid. In other experiments, when the animal was frozen it was immersed in ether, and allowed to lie under the fluid until, by the rising of bubbles of air, indications of returning life were gained; then, taken out, the animal would recover. The gradual return of heat was thus the pure restorative, and the facts helped to explain many accounts as to restoration after freezing, which up to this time had been stated as strongly on one side as they were doubted on the other. The second point considered had relation to the effects on the circulation of freezing the brain. Dr. Richardson here showed that in warm-blooded animals the effect of reducing the temperature of the brain was to produce a gradual slowness of the circulation, and when the freezing was carried to the lower part or base of the brain, to produce the condition of heart and pulse known as intermittency, followed, if the operation were continued, by the entire cessation of the heart's movement. This was a point of great practical moment, as indicating the influence of the brain on the heart. Whenever the brain was reduced in physical power, as from immense mental fatigue, or shock, or anxiety, irregular action (intermittency of the heart) was almost the necessary result. Most people were conscious of this, and often thought with great alarm that they were suffering from disease of the heart, when, in fact, they were merely laboring under temporary exhaustion of the brain. The third point went to show that under the influence of extreme cold on the nervous centres (the brain and spinal cord) the extreme effect of such active poisons as strychnine could for a time be entirely suspended. This raised a hope that in such diseases as tetanus a new and successful mode of treatment might be gradually evolved. The fourth point had relation to the influence of extreme cold in preventing and even in removing the rigidity of death. Because the body after death cools, the inference had been drawn that the rigidity of death was due to the process of cooling. This was the exact reverse of the fact. The rigidity of death was quickened by heat, and prevented by cold, probably for an illimitable period of time, the cold being sustained. Further, by taking an animal already rigid, freezing it, and thawing, the first rigidity could be removed, and the body become flaccid. The last point touched upon related to the effect of freezing and rapidly thawing the skin of certain regions of the body. It was shown that birds treated in this manner presented the extremest irregularity of movement and other signs of nervous disturbance. Thus by freezing and rapidly thawing the skin on the side of the neck of a pigeon, the bird for a time walked sideways in the opposite direction. The author concluded by noticing the able researches of Dr. S. Weir Mitchell, of Philadelphia."—*Abst. of Proc. British Ass. for the Advancement of Science*—(*Medical Times and Gazette.*)

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"*Transfusion, and a new Mode of Management.*—Dr. Braxton Hicks first remarked upon the small extent to which the operation had spread. The various causes he considered to be: 1. The want of success generally, which was accounted for by the impossibility of hav-

ing the apparatus always at hand; the tendency to postpone the operation till too late; and the difficulty of knowing the exact time at which to operate. 2. The inherent impediments to it, from the position of the patient; and the tendency of the blood used to coagulate. This the author considered the most troublesome and dangerous, as a clot might readily be driven into the system. This Dr. Hicks had now overcome by the employment of a solution of phosphate of soda, mixed with the blood of the supplier while flowing. He had first tried it on the lower animals, and then in three cases in human females during delivery. It had simplified the operation to a great extent. The solution is well known to be tolerated by the system."—*Ext. from Proc. of the British Medical Association*—(*The Lancet.*)

Repair and Regeneration of Animal Structure.—"Comparative anatomy, besides benefiting the public firstly, and the profession secondly, is of use to human biology and medicine, as such, inasmuch as it casts so much light upon the problems which the more highly evolved organs, functions, and other relations of our own species, render in a much higher, and, indeed, sometimes in the highest degree difficult or impossible to investigate. Answers to what are riddles in human anatomy and physiology are often to be found given in very simple language in the structures and functions of the lower and lowest animals. Of such hints furnished by the brute creation towards the proper solution of certain problems which concern each and all of us in dealing with our own species, I will herewith, by your permission, give a few. Of the use of rest toward the repair of injuries I presume there is little doubt, but the best established teaching is all the better for the support of a few concrete examples. Now, in what animals do we find the greatest capacity for repair of injuries, and for the reproduction of lost parts and limbs? Precisely in those in which the whole of life is carried on at the slowest rate, and in the nearest approximation to rest which is compatible with animality,—in those animals, to wit, which breathe water, and have but its scanty percentage of dissolved oxygen to sustain their animal functions. The metamorphoses which an animal may have undergone, or may have to undergo, have very little directly to do with its power of recovery from injury, or of regenerating a lost limb. No animals go through more complex metamorphoses than do many of the crustacea, and nearly all the echinodermata, yet assuredly no other class has a larger capacity for the reproduction of lost fragments of their bodies. Now, the latter of these classes is exclusively, and the former all but exclusively, aquatic. The more perfect, again, an insect's metamorphosis, *i.e.* its power of building up tissues and organs, the more perfect ordinarily, or rather the more profound, has been its quiescence as a pupa. Indeed, the very exception here proves the rule, and proves it to be a good one, for such hemimetabolous insects as, like May and dragon flies, come, in their imago state, to differ almost as much from their larval forms, as the imagos of many holometabolous insects do from their larvæ, are during those preparatory stages as completely aquatic as any crustacean (Westwood, 'Introduction to Entomology,' ii. 29, 38; Carus and Gerstaecker, 'Handbuch der Zoologie,' p. 29). I am aware that there is such authority as Mr. Paget's ('Surgical Pathology,' p. 123, ed. Turner) and Mr. Darwin's ('Animals and Plants under Domestication,' vol. ii. p. 15) in favor of regarding the power of repairing injuries as standing in an inverse ratio to the amount

of metamorphotic change an animal has gone through; and I must therefore take the more pains to show that my explanation, to the effect that this happy power depends mainly upon the peacefulness and quiet with which the various processes of life are carried on ordinarily, and after the mutilation, is the truer one. My opponents' case would rest on such facts as these which follow. I will give them first, and then show how they really support my views. The larvæ or tadpoles of the tailless batrachia, but not the adults, says Dr. Gunther (Darwin, l. c., and Owen, Comp. Anat., Vertbr. i. p. 567), are capable of reproducing lost limbs. So with insects, says Mr. Darwin, *in loco*, 'the larvæ reproduce lost limbs, but except in one order' (the Orthoptera, and among them the Phasmidæ bat?)* 'the mature insect has no such power.' There is, however, one common property which lies at the bottom of the power of repair both in the larval forms and in the perfect adult animal, both in the invertebrata and in the vertebrata specified. This common property is the comparative insignificance of the apparatus for aerial respiration in all alike, in the larva of the anurous amphibia, in the larva of the butterfly, and in the orthopterous insect, the lungs or the tracheæ, as the case may be, contrast to disadvantage with those of their congeners, or adult representatives, which have come to differ from them in having lost the power of reproducing lost parts. But active respiration is a prerequisite for activity of function and rapidity of rate of vital processes; and the absence of this is, according to my argument, the cause of the presence of the reparative power. The lungs are of course all but wholly in abeyance in the tadpole, and the tracheæ have no vesicular dilatations developed upon them in the caterpillar forms of any insect, nor in the adults of the non-volant Orthoptera. In the Phasmidæ, the curious 'walking stick' insects, we observe just the same sluggishness, combined with great tenacity of life, which we observe among mammals in the Bruta. Let me add some more facts in further illustration of my position. The Myriopoda, which Mr. Newport has shown to possess this power of repair up to the time of their final moult, are so little like the more typical insects, as to have been classed with the Crustacea, by no less an authority than Von Siebold. Any one, again, who will compare the simple non-cellular lung of the adult batrachian newt *salamandra aquatica*, which possesses an unlimited power of repair *as an adult*, but *not in its young stages* (Bonnet, Œuvres, Hist. Nat. v. Pt. i. p. 294), with the lung of the adult frog, will have little difficulty in understanding how their power of repair differs out of all proportion more than the amount of the metamorphotic changes they severally go through. The land salamander, *salamandra terristres*, has so far as I know escaped the hands of Spallanzani and Bonnet: its adult lung being little inferior in extent and development of spongy matter to that of the adult anura. I should expect the power of regeneration to be reduced to zero as in them. If the teaching of Comparative Anatomy has forced me to differ from the teaching of Mr. Paget, there are other facts in the same region of research which, as it seems to me, put one of his other many valuable doctrines in a clearer light than even his own clear enunciation of it.

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* There seems to be some little doubt whether even a Phasma can regenerate lost parts after its last moult, and some authorities would not consider it adult till after such ecdysis. The crustacea, however, moult many times after attaining the adult state, *i.e.* a state in which they can reproduce *the species*.

'Each man's capacity,' says Mr. Paget (*Lancet*, Aug. 24, 1867), 'for bearing a surgical operation may be best measured by the power of his excretory organs in the circumstances in which the operation will place him. Now, I am inclined to ascribe the very considerable, and, indeed, on my views, somewhat exceptional powers of reproduction which two sets of air-breathing terrestrial animals, the pulmonate snails and the earth-worms, possess, to the great development of their excretory apparatus. Living as they do very ordinarily in atmospheres laden with carbonic acid from decaying vegetable matters, they must get rid of the products of their waste and wear in the shape of solution in fluid; and the alkaline secretion with which the bodies of both are so abundantly slimy, furnishes just the required medium. When injured or mutilated, these animals can withdraw themselves pretty completely from the atmospheric oxygen by shedding out this secretion, and it at the same time disembarrasses their system from any excess of carbonic acid which may be generated within it. Thus they can attain the most perfect possible condition for repair and regeneration, the minimum of activity of all save the excretory organs; and I submit that it is possible that these two conditions may be connected as cause and effect, just as in the reverse direction a defeat of surgical skill may be connected with the presence of a fatty kidney or liver, or the excitability of a nervous system. It is going perhaps too far to attempt to explain the much greater power of repair which Amphibia possess as compared with either Pisces below or Reptilia above them to the larger size, and consequent smaller aggregate surface and less perfect aerating power of their blood-cells, and to the transpirability of their naked skins, which execute such important depuratory work for them, and are so closely connected and correlated with their lungs, livers, and kidneys. It is curious, however, and interesting to remark that the older anatomists, in commenting on the very obvious solidarity of these latter organs, went on, in their ignorance, I imagine, to a great extent, of the nature of amyloid and other degenerative changes in such cases, to observe that it was illustrated by the "fact" that, as the lungs grew smaller so the kidneys grew larger in phthisis.'* (See Funke, 'De Salamandræ Terrestris Vitæ,' 1827, and Michel, 'Path. Anat.,' i. 613, 646.")—*Extract from Professor Rolleston's Address in Physiology to British Medical Association*—(*The Lancet.*)

"*Plastic Surgery.*—Mr. Collis (Dublin) described (*Ibid.*) his method of operating for vesico-vaginal fistulæ, by splitting the margins of the fissure, and using quilled sutures. He also demonstrated a new mode of operating for hare-lip, the peculiarity of which consisted in utilizing all the parings. He further advocated the use of chloroform in cleft-palate operations, and strongly recommended the propriety of saving the palate, and, if possible, the alveolar process and teeth in tumors of the superior maxilla. His paper was profusely illustrated."

* For accounts of experiments as to regeneration of lost or destroyed parts, see Darwin, "Animals and Plants under Domestication," ii. 15, *ubique citata.* Owen, "Comp. Anat. Vertebr.," i. p. 567. Newport, "Phil. Trans.," vol. cxxxiv., 1844, *ubique citata.* Paget, "Surg. Path.," ed. Turner, p. 123. Spence, "Batr. Ana. and Mag. Nat. Hist." for the current month, August, 1868, citing the "Lloyd" of Hamburg, p. 118. McIntosh, "Experiments on Carcinus Mœnas," p. 28.

"*Fracture of the Nasal Bones and Right Superior Maxilla, with Displacement of the Ball of the Eye.*—VON LANGENBECK relates, in the *Arch. f. Ophthalmolog.*, xiii., the case of an officer of a railroad, who, in consequence of an injury inflicted on him by a locomotive engine, had the bones of his nose entirely crushed in; at the same time a fracture was produced of the orbitary process of the right upper jaw; an opening was made into the right antrum, with laceration of the eyelids and right cheek. The eye had been forced through an opening in the floor of the orbit, of a finger's breadth, into the right antrum, in such a manner that the axis of the eye was directed perpendicularly upwards. By separating, as far as possible, the edges of the fracture in the orbital plate, the globe of the eye was replaced in the orbit with a continuance of the power of vision. After the healing of the wounds in the eyelids, there was an inability to raise the upper one, and in consequence the sight was interfered with. By two plastic operations this difficulty was removed to a sufficient extent to enable the patient to see with the injured organ. After a time this became attacked with suppurative *keratitis*, with wasting of the entire globe."—(*Centralblatt f. d. Medicinisch Wissenschaft*, and *Amer. Journ. Med. Sci.*)

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"*Closure of Hard Palate—Remarks.* (Under the care of Mr. FRANCIS MASON, Westminster Hospital.)—This patient was a girl, aged twenty, upon whom Mr. Mason had operated four years ago. He then closed the soft palate, adopting Sir William Ferguson's method, and the parts united perfectly. About two years back he attempted to close the hard palate, but the soft tissues sloughed. The fissure was now about the size of a large pea.

"On April 28, 1868, Mr. Mason performed the following operation: a strong instrument, known as 'Langenbeck's raspatory,' was introduced through the soft tissue near the alveoli on each side. The soft parts were readily separated from the vault of the palate in a direction toward the aperture. The edges were then pared and brought together with two silk sutures. There was not the slightest tension on the parts. The case did perfectly well. Mr. Mason explained that at the previous operation he had adopted a rather different mode of proceeding. He had then used a rectangular knife, and had separated the soft structures from the hard palate in a direction from the fissure toward the alveoli, and had completed the operation by incising the flap on each side. He thought that the operation he had just performed was more easily accomplished, and a much more substantial flap was obtained than on the previous occasion."—(*Medical Times and Gazette.*)

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Exfoliation of Alveolar Plate of Lower Jaw in Chorea.—"In the medical wards of the Royal Infirmary, Liverpool, under the care of Dr. Vose, there has been quite recently a case of severe chorea, which has been followed by a peculiar result well worth notice. A boy, of about eleven or twelve years of age, had been in the Infirmary for about two months with a very severe form of chorea, in which the muscles of the jaws were much affected, and the jaws were always being clashed together, so that the sound could be heard all over the ward. Every now and then one of his teeth would become loose, and be pulled out by the boy. His gums became sore and pulpy, but no peculiar discharge came from his mouth. One morning the nurse brought down to Dr. Orton, the house-physician, a large piece of dead bone which she said the boy

had just pulled out of his mouth. This proved to be the alveolar portion of the lower jaw, extending from the right second molar to the left canine inclusive, two or three of the sockets still containing teeth. From the rest the teeth had been lost one by one during the previous month. The boy had never been salivated; he had been treated with sulphate of zinc, and for a short time with bromide of potassium. It appeared most likely that a longitudinal fracture of the bone had taken place at one time from the violent clashing together of the jaws, and that from the same cause union had been prevented and the vitality of the bone destroyed. Considerable deformity was, as may be imagined, produced, and the boy's friends took him out of the Infirmary when they next saw him, so that the case has been lost sight of."—(*Med. Times and Gaz.*)

Emphysema of Face.—"The only accident that can happen in inflating the ear, is where there is ulceration, or abrasion of the mucous membrane, and the air is forced through into the cellular tissue, giving rise to what is called *Emphysema.* This generally makes its appearance under the skin, beneath the ear, and may extend down over the throat. The air can be felt under the skin, and the patient will, perhaps, hear it crack when the jaw is moved. This will alarm him considerably, but in itself is a very small matter, as it will pass off in twenty-four hours. Where the emphysema is considerable, it will cause an ugly swelling about the neck. If the wind gets into the soft palate and puffs it up very much, it may give rise to symptoms of suffocation. The physician can relieve these at any time, by pressing the soft palate up from the epiglottis with the finger. If he cannot press the air out, as it comes in, then he must make several punctures into the palate, and press it out through them. This will give permanent relief. Under such circumstances the fears of the patient must be allayed, by assurances of no danger, from the physician, at the same time explaining the cause of the trouble to him. Emphysema, however, will very rarely happen, and in an ordinary degree is perfectly harmless. I have caused it in the last two years about four times, but to a slight extent. All passed off in twenty-four to thirty-six hours. Of course, where this has happened once, it is not advisable to repeat the inflation in the same ear soon afterward, for it will most certainly take place again."—(A. D. WILLIAMS, M. D., *Cincinnati Lancet and Observer.*)

Speech Restored by Artificial Palate.—*The Scientific American* states: "The editor of the *Bainbridge Argus* gives an interesting account of restoration of speech by means of an artificial palate, made for him by Professor Kingsley of New York College of Dentistry. He says:

"'All persons acquainted with us are aware of the loss of speech which we sustained in early life by the destruction of our palate, caused by scrofula. This almost totally disqualified us for any business, calling us beyond the circle of our immediate friends and associates. A stranger could rarely understand a word we might say. We thank God that we are enabled to state to our friends that by means of an artificial palate, put in our mouth by Dr. Kingsley, our speech has been entirely restored, and we are now, for the first time during the last twenty-eight years, qualified to converse freely with any one without the slightest inconvenience or embarrassment, and without being misapprehended or misunderstood in any word or sentence we may utter.

It has proven a very great relief to us—so much so that our past life seems to have been an uninterrupted blank.'"

"*Local Anæsthesia.*—We have always had our doubts that the local anæsthesia produced by the spray of ether was attributable to the partial or entire freezing of the parts to which it is applied, as has been claimed. The *Medical Gazette* contains the following report of a case in which ether was thus applied, which confirms our doubts:

"'The subject of the experiment, a patient of Dr. Geo. H. Perine, of this city, had some sixteen teeth extracted with scarcely any pain, and what little discomfort there was he referred rather to the gum than to the dental nerves. Richardson's spray instrument was used, and the jet directed upon the external orifice of the ear and a little in front of it for between three and four minutes. One side was anæsthetized first, and a number of teeth and stumps on that side (upper and lower) extracted, and the same process repeated afterward on the opposite side. The central incisor of the side first operated on caused some pain, partly perhaps from subsidence of the anæsthetic action (that being the last tooth removed on that side), partly possibly from some inosculation of the terminal branches of the superior maxillary nerve of the opposite, undeadened side.

"'Many physiologists hold that the anæsthesia produced by the spray instrument is due, not to any specific effect of the agent employed, but simply to a "freezing process," the result of rapid evaporation. In this case, however, even the integument (though greatly reduced in temperature) was not *frozen;* and had it been, it would have been impossible for the mere action of cold to penetrate to the ganglion of Casser. The subcutaneous cellular tissue, fat (the worst possible conductor) muscular and fibrous layers, must surely protect the ganglion from very intense refrigeration, and, moreover, the insensibility of the dental nerves continued for some minutes after the skin had recovered its warmth at the spot where the spray had been applied.

"'Dr. Perine has since used this process for the extraction of two or three other teeth, with very satisfactory results, and in one case of severe facial neuralgia succeeded by its means in giving instant, and, strange to say, more than temporary relief.'"—(*Scientific American.*)

Electrolysis in the Mouth. By Mr. Bridgeman.—"The purport of this paper was to afford a corroboration of the electrolytic theory of dental caries. The prize essay, which some six years ago gained the Tomes gold medal of the Odontological Society, was founded on the destruction of the tooth substance by electricity. In awarding the medal, the President observed that 'some of the points, being of novel application, they were hardly up to;' and this feeling being apparently universal in the profession, led to its remaining unnoticed. It was doubted whether results similar to those shown in the experiments, which were performed upon what were deemed to be dead substances, would be obtained *in situ;* consequently, in order to set aside this objection, it became essential to produce some natural phenomenon of a corresponding character, occurring in the mouth, which should be a confirmation of it. This proof was found in the occurrence now brought under notice. A ligature of silk twist, on being removed from some front teeth, was found to have produced a deep groove in the enamel along its entire course; at the same time the fibres of the silk had

become matted together with an incrustation of crystals of lime, indicating a clear case of electrolytic transfer, in which the lime-salts of the enamel had been dissolved out and recrystallized upon the silk. In this electrolytic theory of decay, particles of charcoal arising from eremacausis, which, like the silk, are electro-negative, were stated to play the same part with the enamel and dentine of the tooth as the silk had done in this instance. But pressure, rendering the tooth-substance non-homogeneous, was equally capable of producing a negative centre from which local galvanic action would arise. The characters peculiar to decayed dentine are its entire decalcification and the almost total absence of any lime solution, but having in its stead an abundance of free acid—two features which all other theories are incapable of accounting for. If a piece of dentine be placed for a few days in water under the electrodes of a small battery, the spot beneath and around the positive pole will be found to have become softened, decalcified, and strongly acid, just as occurs in natural decay. In addition to this, the lime will be transferred to the negative in the same manner as with the silk. It also affords the only intelligible explanation of the formation of tartar yet offered. Tartar is an electro-deposit from the saliva, and is repelled by the electro-positive state of the crown, but adheres to the electro-negative root at the neck. This polar condition of the tooth, illustrated in the different modes of growth in the crown and the root, is pointed out as a very important character, and one to be well considered; for, wherever treatment of any kind may be required, this, to be successful, must be in harmony with such an arrangement."—*Proc. British Association for Advancement of Science*—(*Medical Times and Gazette.*)

Pus Formations.—In the course of an instructive paper on "Progress in Pathology," in the *Western Journ. of Med.*, Dr. JAS. F. HIBBERD gives the following summary on this subject: "Two leading theories are entertained in relation to suppurative inflammation. 1. The plasma of the blood is supposed to be exuded into the part inflamed, and this serves as a blastema in which originate cells that degenerate, and floating in a liquor puris constitute pus. This is the teaching of most eminent British pathologists, and perhaps the Vienna school of Germans. 2. The cells of the connective tissue multiply by proliferation, and then, instead of developing into tissue proper, they degenerate into pus globules, the more fluid parts of the blood exude through the cells and serve as the liquor puris. This is the doctrine of Virchow and the Berlin school of German pathologists.

"Virchow also declared that neither the microscope nor chemistry showed any difference between pus corpuscles and the white corpuscles of the blood, and that we could only determine whether they belonged to one or the other class by ascertaining whether they were inside or outside the blood-vessels.

"He also announced the existence of, and pictured certain juice-bearing canals in, connective tissue,* which gave passage to a colorless fluid from the blood, that nourished parts devoid of blood-vessels proper, *e.g.* the cornea, intervascular spaces, etc.

"Certain German philosophers have apparently convinced the world

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* A recent writer in the *Medical Record* gives Recklinghausen credit for first having proclaimed these canals in 1862, but Virchow treats of them at some length in his work published in 1858.

at last that an exterior limiting membrane is not an essential part of a cell. They instance the amœba which is at the bottom of the scale of animal existence, and which consists of a lump of homogeneous protoplasma. It takes its nourishment by causing the particle of organic substance it is about to eat, to sink into its substance at any point; or, perhaps it would be more nearly correct to say, that it laps itself around its food, and having absorbed from the aliment what it can use as nutriment, unfolds itself and permits the residue to escape. It possesses the power of locomotion by virtue of sending out a prolongation of its substance, or several such prolongations, attaching one to some supporting point and then following to that point with its whole body.

"It has also been conceded that pus corpuscles and blood corpuscles (both colored and white) are simple lumps of protoplasma without cell-membrane. This latter point has been insisted on for many years by Prof. Dalton in our own country, and by Beale in England.

"Recklinghausen discovered that pus corpuscles, in their normal condition, have the same vital power of altering their shape and changing their position that is possessed by the amœba, and these phenomena are accomplished by the same process.

"Haeckel ascertained that the white corpuscles of the blood have a similar vital endowment. Thus we seem to arrive at the fact that these morphological elements of the human frame have a vitality of their own, corresponding to that of the simplest animal creation.

"Cohnheim, by observation on inflamed corneæ of frogs determined, first, that pus corpuscles are not transformed connective tissue cells, as supposed by Virchow; and, secondly, that they are not made in the cornea at all, but first accumulate at the border of the cornea in connection with congested blood-vessels, and then are presently transferred to the inflamed point in the cornea, leaving the margin clear of them.

"Certain pigments, aniline blue for instance, injected into the circulation of frogs, will color the white corpuscles of the blood and no other texture. Cohnheim found when he thus colored the white blood corpuscles of a frog, and then produced keratitis, that the pus corpuscles that accumulated on the margin of the cornea were also blue, and that they were transmitted from this situation to the inflamed spot through the juice canals already spoken of. Here, then, was demonstrated the important fact that pus corpuscles were white blood corpuscles in an abnormal situation. No wonder Virchow could find no microscopical or chemical difference between them.

"The next step was to determine how these colorless corpuscles of the blood accomplished their migration from the interior of the blood-vessels to the point of inflammation. To carry out this purpose observations were transferred from the cornea of the frog to his mesentery, and after all the necessary preparations were made and precautions taken—and they were numerous and intricate—the following phenomena were established: the mesentery being excited to inflammation, the arteries dilate to double their original size, the current of blood is retarded, and colorless corpuscles line the interior of the arterial walls. This condition of the arteries remains during the continuance of the inflammation.

"Next the veins also enlarge to double their normal caliber, and have the white corpuscles form a motionless layer against the interior of their walls, while the red corpuscles continue in a laggard stream along their

centre. After awhile a white corpuscle sends out a prolongation against the wall of the vessel which seems to push the wall before it, making a protuberance on the wall's exterior. This protuberance continues to enlarge, soon becomes pear-shaped and attached to the vessel only by a slender pedicle, and when this separates there is a white corpuscle outside the vein, with one or several projections, and no perceptible opening through which it came. Nevertheless, Oedmansson discovered stomata in the walls of the blood-vessels, and Aeby and Ouerbach found the same in the walls of the capillaries, and it is by these that the active globules find their way out.

"This transudation continues around the venous surface until there are several rows of contractile colorless corpuscles on the outside of the vessels, and still they continue to penetrate its walls.

"After the arteries and veins have been in these conditions some time, the capillaries also enlarge to some extent. In a part of them the current of the blood continues normal, in another part it is retarded, while in the remainder there is complete stasis. Where the blood is only retarded in the capillaries the white corpuscles penetrate their walls as in the case of the veins, and in addition a few of the red corpuscles also follow the same course. Within twenty-four hours the whole field of observation becomes opaque, the once transparent mesentery being infiltrated, as it were, with pus corpuscles which gradually make their appearance on its surface through the canals of the connecting tissue, still keeping up their amœboid movements, and with the inflammatory products making the ordinary purulent deposit of serous inflammation.

"Cohnheim experimented not only on frogs, but also on rabbits and cats as well, and with like results. Koster, Volkmann, Hering, and others, have pursued the same line of investigation as Cohnheim, and altogether they appear to have established that in all suppuration the entire product of pus corpuscles are but the migrated white corpuscles of the blood, and this, whether the pus is formed in an abscess, on serous surfaces, or on mucous membranes.

"In answer to the query that every one is doubtlessly about to make as to how the large amount of pus corpuscles in extensive suppurating surfaces can be furnished by the blood when that fluid contains but a small percentage of this morphological element, it is answered that in acute inflammation the lymphatic glands and spleen become hyperæmic and very active, and afford a large and rapid supply of colorless corpuscles to the general circulation."

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Craniology.—The *Medical Times and Gazette* says: "Professor Huxley has dealt a blow at all ethnological systems in which the shape of the skull is erected into the principal standard by which the position and affinities of a race are to be judged. In a speech he delivered at the Prehistoric Congress at Norwich, he lays it down that the skull is by no means the best test of distinction. Take, for instance, he says, a peasant from Sweden and another from the Black Forest—both handsome, stalwart men, and both manifestly members of the same race—and you will find their skulls as distinct as possible, one long and the other broad. The characteristics on which he relies are complexion, hair and eyes.

"'Guided by these, mankind may be divided into—1. The Australoid type, of which the complexion varies from dark to chocolate, the eyes

are black, and the hair long and wavy. 2. The Negroid type, in which the complexion runs down to absolute blackness, the eyes are dark, and the hair crisp and woolly. 3. The Mongoloid, in which the skin is yellowish or olive, the eyes black, and the hair straight and lanky. 4. The Xanthochroid or Blonde, which has fair skin, showing through it the pink tinge of the blood, yellow hair, and blue eyes. In the two latter of these types the skull is variable, in the two former it is invariably long. The Mongoloid and the Xanthochroid races present no special difficulties in their geographical distribution. The former have spread from Northern Asia all over the two Americas; the Xanthrochroid have emerged from the Himalaya and the Caucasus, to cover large continuous tracts of Asia and Europe. But the other two types present singular geophraphical anomalies. The Australoid type is found only in the mainland of Australia, far away in Central India, in some tribes of the Deccan, and again in the ancient Egyptians, as depicted on their monuments. The Negroid type, whose home is Africa—but only Africa south of the Sahara—is only found again at a vast distance in Malacca, in the Andaman islands, and in a line running round Australia, and including Papua, the Fiji Islands, and Tasmania. Whence this singular distribution? Does it not point to a vastly remote time, when these distant localities, between which there now rolls a vast ocean, were parts of one tropical continent? And if so, does it not throw back the appearance of man upon the globe to an era immeasurably more remote than has ever yet been assigned to it by the boldest speculators?'"

"*Chemistry of the Osseous Tissue in Men and Animals.*—Although none of the animal tissues have been more thoroughly examined by chemists than the bones, there are still several points on which there is considerable discrepancy of opinion. In order, if possible, to clear away these differences, Dr. Zalesky has instituted a series of analyses of the bones of men and various animals in the Tübingen Laboratory, under the superintendence of Professor Hoppe-Seyler. The following are the most important of his conclusions:

"1. The ratio of the inorganic to the organic constituents of bones is so nearly constant that any discrepancy may be accounted for by the more or less perfect separation of tendinous fibres, vessels, etc.

"2. The relative quantity of each of the individual constituents of the bone-ash—as CaO, MgO, PO_5, CO_2, ClCa, FlCa—may be regarded as constant in man and the animals which he examined.

"3. Excepting in the carapace of *testudo græca,* a chlorine compound, which is insoluble in cold water, is found in all bones.

"4. The quantities of chlorine and fluorine are in all bones nearly the same, the fluorine slightly preponderating. The quantity of fluorine found by Dr. Zalesky was considerably less than that found by preceding chemists, the mean quantity of FlCa in the bone-ash of the ox being 0·616, in that of man 0·47, and that of the tortoise 0·419 per cent.

"5. An augmentation of either the lime or the phosphoric acid contained in the food exerts no constant influence on the ratio of the organic to the inorganic substance of the bones, or on the ratio of the lime to the phosphoric acid."—(*Ibid.*)

"*Phosphor-Poisoning.*—Drs. Fournier and Ollivier lately brought before the Medical Society of the Hospitals of Paris the case of a girl

aged fourteen, who for the last four years had been employed in a lucifer match manufactory. She was admitted into the Hôtel Dieu on the 3d of March, 1867, with considerable swelling of half the face, and fetid and sanguineous salivation, and died three days afterward. She had been ill only for about four days, first complaining of pain in the jaw, and inability to open her mouth. The symptoms had rapidly increased, and when she entered the hospital the prostration was already alarming. This typhoid state increased in spite of active remedies, and she died as just stated. Of course this was only the first stage of necrosis, which, by its severity, proved fatal. The lower maxilla could not be examined." —(*The Lancet.*)

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"*Turpentine as an Antidote to Phosphorus.*—The *Archives Gén. de Médecine* calls attention to the custom of the workmen in a match factory at Stafford, who apply phosphorus to the matches, of carrying on their breast a tin cup, containing essence of turpentine. This precaution is said to be sufficient to prevent any ill effects from the action of the phosphorus. It was previously known that the vapor of turpentine prevents the ignition, and even the phosphorescence of phosphorus, but the practical application of this knowledge is not so generally adopted as it should be."—(*Med. and Surg. Reporter.*)

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Preservation of Animal Tissue.—"According to a recipe recently patented in England, meat of any kind may be preserved in any temperature after it has been soaked for ten minutes in a solution made of the following ingredients, well mixed: one pint of common salt dissolved in four gallons of clear cold water and half a gallon of the bisulphite of calcium solution. It is said that experiments show that meats so prepared will keep for twelve days in a temperature of from 80 to 110 degrees, and preserve their odor and flavor unimpaired. By repeating the process meats may be indefinitely preserved, and if it is desired to keep them an unusually long time, a little solution of gelatine or white of an egg may be added to the wash."—(*Amer. Artisan.*)

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"*Preserving Protosulphate of Iron from Oxidation.*—Mr. George Wellborn, of London, has recently found a new and simple method of accomplishing this object, which merely consists in putting a small lump of gum camphor, wrapped in tissue paper, into the bottle with the protosulphate of iron. After three months, during which time the bottle was very frequently opened, the salt was as free from oxidation and the solution as clear as when first made. Should any objection be made to the odor of camphor in the salt, or its impregnation with the volatilized camphor, we have no doubt that it could be easily removed by a little alcohol immediately before making a solution in water, taking care to wash away the alcohol first. Or if the salt is wanted for the preparation of pills, or in a dry state for internal use, when the stomach is too sensitive to bear the odor or flavor of camphor, the alcohol may be used in the same way, and washed off by a little water, after which the crystals may be cautiously dried in the usual way."—(*Journal of Applied Chemistry.*)

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"*Pure White Gutta-percha.* By F. Baden Benger.—The demand or this substance, for dental purposes, is now sufficiently established to justify me in making a few remarks on it and its preparation. I have

examined specimens of the so-called 'pure white gutta-percha,' now commonly sold, and find that for the most part they may have been designated almost as correctly 'pure white oxide of zinc,' being made up with this substance in very large proportions, and I believe thereby rendered less tough, durable, and fit for the purpose; this opinion has been strengthened by the fact that persons to whom the pure and afterward the commercial article have been supplied, have frequently complained of the inefficiency of the latter. I am further induced to describe the process I use, by the very high price required by makers of the really pure substance.

"A good sample of crude gutta-percha will yield at least 75 per cent. of the pure resin. Some care should be taken to obtain a specimen with as little impurity as possible. Some of the kind I find best is imported in roundish blocks which are exceedingly hard and difficult to cut, but any of the large gutta-percha manufacturers will supply the same, torn into fragments similar to the accompanying specimens. Four ounces of this, digested with five pounds of methylated chloroform for a few days, will form a solution sufficiently fluid to filter through ordinary bibulous paper; this should be conducted in such a manner as to allow little or no loss of chloroform by evaporation, the apparatus for filtering volatile liquids described in Mohr and Redwood's 'Pharmacy' answering the purpose; the addition of another pound of chloroform rendering the filtration more expeditious. To the filtered solution, which should be bright and nearly colorless, add an equal bulk, or a sufficient quantity of spirit of wine, to precipitate the gutta-percha, which will separate from its solvent as a white bulky mass; this should be rinsed with spirit, pressed in a cloth, and dried by exposure to the air: its condition is then perfectly white, but too porous for dental use; it should then be boiled for half an hour in a porcelain capsule, and rolled in sticks while hot. The chloroform can now be separated from the spirit by the addition of water, and lastly the spirit from the water by distillation, at the leisure of the operator.

"There is therefore no reason why the chemist should not prepare this substance himself, and if he is careful to prevent the loss of chloroform and spirit in the process, its reduced cost and greater purity will compensate him for the trouble."—(*The Chemist and Druggist.*)

"*Chemical Cement.* By Dr. A. A.—Caoutchouc cement is obtainable by melting carefully india-rubber, taking care to stir well during the melting process; at the same time dry fire-clay is added, from 6 to 8 per cent. of the weight of caoutchouc, while at last, in order to give proper consistency, slaked lime is incorporated with the mass. This cement stands the action of boiling sulphuric acid. It may perhaps not be out of place to mention here the zeiodelit, made up of nineteen parts of sulphur and forty-two parts of powdered glass or porcelain; the sulphur is molten, and the powder alluded to at the same time heated to rather above the melting point of sulphur, and is then added to the latter, while the mixture is continually stirred; it is then cast in blocks, and used, of course, after heating again, for various purposes as cement, etc."—(*Chemical News.*)

"*To clean Silver Plate.*—Fill a large saucepan with water; put into it one ounce of carbonate of potash and a quarter of a pound of whiting. Now put in all the spoons, forks, and small plate, and boil them for

twenty minutes; after which take the saucepan off the fire, and allow the liquor to become cold; then take each piece out, and polish with soft leather. A soft brush must be used to clean the embossed and engraved parts."—(S. PIESSE, *Scientific American.*)

"*New Brushing and Polishing Apparatus.*—A patent has recently been granted to W. H. Willson, of New York City, for an invention which consists in the arrangement of a coiled spring, and a system of gearing within the body of a cylindrical brushing or polishing device, furnished with suitable axial handles in such manner as to produce the requisite rotary movement of the same while held in the hands, without the use of the driving belts, or other external driving power, ordinarily applied to such devices. The invention also includes the arrangement of a friction-brake within the cylindrical body just named, that the rotary movement of the latter may be readily stopped when desired."—(*American Artisan.*)

Mica Spectacles.—In the proceedings of the Heidelberg Ophthalmologische Gesellschaft, reported by HASKETT DERBY, M.D. (*Boston Med. and Surg. Jour.*), it is stated that "Dr. Cohn, of Breslau, exhibited a new form of spectacles for the protection of the eyes of workmen from chips of metal, the influence of excessive heat, and other frequent sources of injury. The frames were made of light and easily flexible wire, and plates of mica substituted for glass. In order to give the requisite blue tint, much difficulty had been at first experienced, but a plan had finally been devised of taking two thin plates of mica, instead of one, and interposing a layer of colored gelatine, which was found to answer the purpose perfectly. Such glasses proved an efficient means of protection, and could be furnished at an exceedingly moderate price."

"*Smoky Chimneys.*—A correspondent of the *Builder* submits a simple and cheap remedy for smoky flues, which is stated to be successful in eight out of ten bad chimneys. The principle on which it depends is sound, and its use would obviate, in many instances, the employment of the unsightly chimney-tops which so often mar the architectural effect of otherwise fine buildings, without answering the desired end. He says: 'I find from experience that, by the use of a fine wire-gauze of from thirty-six to forty wires to the inch, as a screen, blower, or guard, judiciously applied to register-stoves, ranges, or stove-doors, little if any smoke will come into the room. The atmospheric pressure prevents the smoke entering the room through the gauze, and if applied immediately to the front of the fire more smoke will be consumed than by any other means. In that case the wire should be kept two inches from immediate contact with the hot fire.'"—(*Boston Journal of Chemistry.*)

BIBLIOGRAPHICAL.

The Pharmacist, edited by E. H. SARGENT, and published by the Chicago College of Pharmacy, is a new quarterly, soon to be converted into a monthly; and though more particularly intended as an organ of the West, is "devoted to the general interests of pharmacy, practical, commercial, and scientific." In form, paper, and print, it presents a neat appearance; and, from the character of its contents, promises to be a very useful class periodical.

THE

DENTAL COSMOS.

NEW SERIES.

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ORIGINAL COMMUNICATIONS.

THE INHABITANTS OF THE MOUTH AND THE TEETH.*

BY SCHROTT, DENTIST AT MUHLHAUSEN.

Translated by Adolf Petermann, Munich, Bavaria.

PREPOSITION.

THE applause which I received last year at our meeting at Hamburg, as well as the invitation of some of my friends and colleagues, induced me to keep my promise, and to publish my work about the "Inhabitants of the Mouth and the Teeth."

The progress of this work shall not be a scientific essay on micrography, or on natural history, but rather a motive or incentive to further investigation in the practice of dentistry in this dominion. I would like to call the attention of my colleagues to this unexplored field in our profession, to show them, in a very evident manner, nature *in petto*. Particularly would I like to speak to you with living arguments, to show you how, with every atom of caries which remains behind after the cleaning of a decayed tooth, thousands of plants and living creatures will be inclosed by the fillings, and grow up at the expense of the teeth, to increase and hasten the decline of these noble organs. Further, I would like to mention all those endless things which are found as well in the healthy as in the diseased mouth. Some of them are known, some of them are totally unknown; which brings several important results, as well by chemical analysis as by microscopical examinations. It belongs to us to search out the diseases of the teeth, as well as the cause, and to stop their progress; then only are we able to correctly observe them, because we are occupied in this manner every day. I would like to advise every one of my colleagues to arrange a small laboratory, and to procure a good microscope; therewith he can employ

* Deutsche Vierteljahrsschrift für Zahnheilkunde. iv. Heft, viii. Jahrg.

his leisure time in a manner agreeable to himself and useful to science. The more he becomes acquainted with these two branches of the science, the more he will be interested in them. He will, like the alchemist, find many things which he did not look for, and which are often worth more than they at first appeared to be.

INTRODUCTION.

For the study of the inhabitants of the mouth and the teeth, at first we need a microscope, which magnifies seven to eight hundred diameters. The want of room does not allow me to give instructions as to its right use, and it would be wise for the practitioner to procure a good book to use his instrument with advantage. But, though possessing the best instrument and directions, the beginner will have to overcome many obstacles and difficulties, till he has obtained sufficient practice in the setting up of his preparations to accustom his eyes to the sight of infinitesimal objects, and to separate truth from fiction. One of the greatest difficulties is Brown's movement. The attractive power of the homogeneous, as well as the repulsion of heterogeneous molecules, cause in the fluid, which lies under examination before the microscope, a perpetual movement, by which these molecules appear to be endowed with life, but which is only the result of the working of these forces. The circulation is caused either by the drying up of the fluid, or by its ingredients, or its overflow, which, though easily recognized, may be very prejudicial to the examination.

To delusions which are caused by the eyes themselves, there belong so-called "muscæ volitantes," which are produced by the secretion of the Meibomian glands, and pass over the range of vision as slimy threads, in which are found again small cells and other foreign bodies, which have to be carefully separated from peculiar objects. Besides this, the change of temperature, as well as the moistening of the eyes, if experiments be made in a cold room, and the dust and all foreign bodies, are obstacles to a strict observation.*

THE INHABITANTS.

Before we proceed to the strict description of the inhabitants of the mouth and the teeth, I would like to explain what I properly understand under this denomination. In our last meeting at Hamburg, I showed as well as possible the different structures of the three kingdoms of nature, as they are ordinarily or casually found in the mouth. Here are also included all pathological products, as well as those substances which are casually brought in by food and drink, and which rest between or in the carious teeth, under artificial teeth, or anywhere else in the mouth, and which produce more or less influence on the health of the teeth.

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* Muscæ volitantes are attributed by oculists to derangement of the retina or of the digestive organs. J. H. McQ.

Passing over to the strict introduction, we find at first in the mouth

THE SALIVA.

The saliva contains in its normal condition no hard or visible bodies: it is perfectly transparent and fluid. As soon as it spreads itself on the mucous membrane of the mouth, and mixes itself with its secretion, we find the different foreign bodies to which I will return hereafter. If you put saliva on a glass, and place it under the microscope, you will find a crystallization.

THE SECRETION OF THE MUCOUS MEMBRANE OF THE MOUTH.

The secretion of the glands of the mucous membrane of the mouth is perfectly transparent, a little yellow, and does not contain any foreign bodies, such as epithelial cells. The slime bodies, as they are found in the mouth, are here first formed by the admission of the saliva. If dry, the saliva forms regular crystals. Besides this, there are found numerous crystals in the mouth which are brought there, for the most part, casually; but their description would occupy too much time.

THE VEGETABLE SUBSTANCES.

To the vegetable structures belong at first the parasite cells, or the tooth fungi, "protococcus dentalis." As soon as a separating or disturbing cause has begun to operate on the enamel, the vegetable cells begin to grow. Like the moss on the roofs, the green sequestrations on the teeth are vegetable structures, which push their processes between the more or less porous structure on which they exist, while they suck out and destroy the structure, at whose expense they increase and multiply. Such is the work of the fungus on the dentine.

The wood fungus is a good example of this; it eats through beams, and will have such an effect on the living tree that it will cause its death.

The principal cause of the destruction of the teeth must be a parasitic, luxuriant, vegetable growth, which is always found where sour fermentation or putridity takes place.

PARASITES.

The vegetative parasites which are most frequently found are tongue parasites, "leptothrix buccalis;" nevertheless their growth and propagation are nearly totally unknown. Their increase is quite extraordinary; one night is sufficient to cover the tongue and the gums with a layer of these parasites. From the intermediate space of the teeth, as well as from the root of the tongue, you can take, by a very careful observation, a whole tuft of these, if the mouth is not cleaned during twenty-four hours. The immense quantity of these plants in every mouth, in healthy as well as in diseased individuals, in animals as well as in the human subject, is proof that these structures do not show a diseased, but belong to a normal condition of the system.

ÖIDIUM ALBICANS,

Also called champignon du Muguet, is principally found in little children, while they still take the breast, by growth on aphthæ and in carious teeth, which suffer from periostitis.

This parasite is easily known, because it is larger than the parasites of the tongue. By throwing off its processes, which are formed on the ramifications of its extremities, it is always surrounded by oval, uniform cells, which settle on the mucous membrane, and which grow up like seed corns on fresh vegetables. Very often these germs of parasites are transplanted from the child to the breast of the mother, where they grow up in the "rugæ" of the nipples. Varieties of these vegetables are found according to the difference of ground on which they grow, or the age, or the sex, or the disease, and so on.

THE INFUSORIA

Most living creatures, which grow up in the mouth, as well as in every organic or animal infusion, are called vibriones. By their immense number in carious teeth, as well as between them, some naturalists and microscopists have been induced to take these vibriones for a special variety belonging to the teeth. Neither their residence nor their way of life authorizes this denomination, because, as before stated, the same infusoria can also be produced out of the mouth, and grow up in the same manner by spontaneous division. Quite a different kind of infusoria are found in the carious dentine. As soon as the dentine is decomposed in a chemical or vegetal manner,—that is, changed into damp caries,—we find every canal of the dentine inhabited by innumerable living creatures, which are quite different from the common vibriones in their extraordinary smallness, their rapid movements, as well as in their forms, and which therefore gain the denomination of "denticolæ."

I have not yet succeeded in keeping these denticolæ in distilled water, so as to let them grow up, as can be done with vibriones, monads, and parasites. As soon as a piece of caries has been twenty-four hours in water, there are formed vibriones, which take, after a few days, a vermiform movement. After ten or fourteen days these become vibriones spirilla, which obtain, after four or six weeks, five to six windings. These peculiar denticolæ disappear, or are formed again as vibriones.

The largest of the vibriones reach in the section to 1-1000 of a millimetre, and can be well seen by a magnifying glass of 500 diameters; but those of the denticolæ do not reach 1-10 of these; therefore they can only be seen with the best instruments, and after long practice, because the quickness of its movement is so great, it is nearly impossible to perceive its forms, and to put them on paper by drawing. The diameter of the dentinal canal is 2-1000—5-1000; therefore they are 20-100 times larger than those of the denticolæ; so it is very easy to explain

that in a small piece of carious tooth there can be such innumerable living creatures to which the entrance to the dental pulp is open. Its different forms, as periods, semicolons, commas, notes, and so forth, may come from its situation and movements. But nearly always I find again the equal forms. The drawings of my assistant and fellow-laborer, Mr. Munsch, agree perfectly with mine.

Alas! the optician has not yet perfected an instrument by which we can become acquainted with the organization of these little creatures. Neither the bowels nor the moving organs can be pointed out by the strictest observation, and therefore the scholars and microscopists have such different views. Some attribute to them a very fine and composed organization; while others contradict these views totally. I cannot agree perfectly with one nor the other. Though these organs may be imperfect, nevertheless we can see their movements, and indeed very quick movements. Where we have motion, there are also moving organs. This motion may take place in a vermiform manner, which means by contraction and extension, or by cilia, but it must always be executed by muscular strength. We see the operation of these organs so distinctly that it is impossible to deny their existence.

There are also different views regarding the influence which the infusoria exert on the health of the teeth.

My conviction is that the infusoria exert no injurious influence on the teeth. The best proof of it is—first, that in every age, as well in healthy as in diseased individuals, as well in good as in bad teeth, infusoria are found; secondly, that we find them also in animals which rarely, if ever, suffer from toothache; thirdly, that they only move in the fluid of the mouth, propagate, and cannot hurt the dentine; and in the fourth place, that in decayed teeth, in which putridity takes place, we can nearly always find them; therefore the vegetative process is very large.*

(To be continued.)

MECHANICAL DENTISTRY.

EXAMINATION OF REPORT OF THE COMMITTEE TO THE AMERICAN DENTAL ASSOCIATION.

BY WM. REYNOLDS, M.D., COLUMBIA, S. C.

FROM the proceedings of the American Dental Association, at its late meeting at Niagara, as published in the September number of the DEN-

* It has lately been pointed out, by strict observation, that many supposed infusoria belong to the vegetable kingdom; for instance, the volvox, which will become an agglomeration of plants. Their animate contents will be spores, provided with cilia, which move, and form in chains, or which form other vegetables. After Hallier, my denticolæ had to be denominated spirilla, or protococcus dentalis.

TAL COSMOS, it seemed somewhat doubtful whether the report of its committee on Mechanical Dentistry had been formally adopted; but whether or not, its promulgation, with the sanction of that body, without comment, to the profession at large, gives the writer a claim to the privilege of endeavoring to correct fallacies contained in that report, through the same channels by which they have been distributed.

The tone, temper, and undisguised purpose of this report are a reproach to dental art and science of the present day,—an opprobrium to every semblance of professional ethics. What are the principal points it attempts to establish? That "the advent of rubber has driven the best men from their laboratories in disgust," and that "every effort is still being made to produce a substitute for it." That "gold only can be recommended for partial cases." That "continuous gum is the ideal fully attained in supplying lost teeth;" and that "there is no improvement in the status of Mechanical Dentistry." Assertions which, if founded on fact, would place the art and science in no farther stage of advancement than it occupied half a century ago, when "gold only, for partial cases," superseded the era of carved walrus.

Dogmas *ex cathedra* such as these, cannot obtain the assent of the profession at this day. Plain men, who cannot mistrust their own judgment, founded on experience, acquired remote from the side issues or private combinations which are to be found lurking in all associations, however elevated in aim and purpose, will be apt to discover, in this announcement, a bold attempt through fallacious edicts to retrieve lost or failing prestige, rather than an earnest desire to promote the general interest, public or professional. They will discover, in this report, a fixed purpose, on the part of routinists, to perpetuate a monopoly of their own specialty, against general interest, and an equally fixed determination to work the overthrow of that other monopoly, now so "wickedly raiding" against the dentists.

The recommendation of "gold only, for partial cases," coupled, as it is, in the same breath with continuous gum (*par nobile*), however it may react on the association itself, or tend to unsettle the mind of the younger members of the profession, who do not yet know, from experience, that the one is but the faithful protagonist of the other, can meet with no favor from those who, familiar with the mischievous effects of "gold only," rejoice to be absolved, in future, from the farther use of metal *alone for partial cases.*

The great error of routinists arises from an unreasonable reluctance to admit that any other material can be equal to that which has subserved their day and purpose so well, and with which they have been identified so long. In general, they are more disposed to look upon every innovation as an impertinent obtruder, whose merit, if any it may chance to possess, they have neither the leisure nor inclination to investigate.

Gold, say they, is durable, pure, and innocuous; not hesitating, on most fallacious grounds, to pronounce rubber the very reverse of all these. But, leaving out of question the applicability of gold for full upper cases, for which, late in life, it is peculiarly adapted, and when it is most commonly a finality, let the inquiry be confined to its fitness for partial cases over all other material, as proclaimed by the American Dental Association. At the outset, it is by no means necessary that the material used for partial cases should be of an imperishable nature, unless it be assumed that it is within the power of the dentist to arrest or control the unceasing process of nature—absorption. This, not being a supposable claim in favor of durability, the pretension of gold, in this regard, fails. The expense alone of partial gold cases induces the wearer, when habituated to "the situation," to struggle on, until the attachments giving way, or, fractures occurring, soldering, and an extension of the plate, carrying additional teeth to supply the place of those already destroyed, are resorted to—thus going on, until the work of "gold only," for partial cases, is completed, and the patient has attained the "ideal," or rather is prepared for it.

Next in importance to preserving natural teeth by faithful filling, comes the aiding and protection of such as remain by artificial ones, calculated to effect so desirable an object. All experience proves that "gold only" hastens their departure, and the attempt at preservation is seldom undertaken by the generality of rubber workers, who, without regard to age or sex, or the number of teeth to be sacrificed, at a single sitting clear the way for an entire set, and at another, perhaps but a few hours after, introduce a clumsy artificial substitute.

It is following upon such a practice as this that the gums and palate soon assume an appearance well calculated to excite suspicion, which the metallurgist, unaccustomed to encounter, to so great an extent, under gold, when he is consulted, at once attributes to some toxical properties pertaining to rubber, forgetting that his gold plate, under similar circumstances, if it could be swaged to fit as accurately as rubber, would produce the same effect. Continuous gum produces the same effect, to a still greater degree, and so will any bulky or heavy dentures, adapted too soon after extraction.

Applicants, to whom retirement for awhile is no great privation, and expense no object, come from among that class who appreciate best the advice of their dentist, submit to it, and are content to await his time. On the other hand, and, as a general thing, a large majority of those desiring artificial teeth insist upon having their cases adapted as soon as possible, of cheaper material than gold, and who, in search of these, to them, desiderata, often fall into the hands of mere rubber workers, whose interest in their behalf extends no farther than the pecuniary consideration involved. It is from this sort of practice, more than from

the nature of the material, that detraction of rubber arises. On fair, unprejudiced investigation, it will be found that it is to the mass of rubber necessary to attach and sustain the teeth specially designed for this base, that the chief objections to it may be traced. A weighty or clumsy plate, covering the entire roof of the mouth, and greatly diminishing its capacity, must subject the gums and palate to an unusual degree of pressure during mastication ; as the pressure is relaxed by the descent of the lower jaw, the plate recovers its original position, partly by its own gravity, partly through the effect of a chamber, acting as a fulcrum against the hard palate, and, in part, by the articulating teeth forcing it to come to its original position. In its descent, an accurately fitting rubber plate carries the integuments with it,—the soft parts involved between the plate and the alveolus, thus subjected to an unceasing alternation of pressure and traction, soon become infiltrated, tumid, turgid, and finally, as this pumping process goes on, the entire surface to which the plate adheres assumes a raw, hot, and highly inflamed condition, erroneously attributed, by some writers, to occlusion of the pores, or an accumulation of caloric, which rubber, as a feeble conductor, is unable to carry off. The objections urged on account of its containing mercury and sulphur, are undeserving of comment. Before either can be set free, the base must undergo decomposition, which, when well vulcanized, does not take place. Sulphur is innocuous, and whatever mercury the coloring matter contains cannot exceed the amount in a *single* amalgam filling, as some operators apply it. If, then, on investigation it be found that clumsy or heavy base, when too soon adapted, is productive of this diseased appearance, the idea that rubber, in itself, is injurious, may be dismissed.

If "the best men had not deserted their laboratories," or could be prevailed on to return to them, divested of bias in favor of their own specialty and of prejudice against rubber, with a determination to investigate the merits and demerits of each, on true philosophical principles, they would find that "the status of Mechanical Dentistry" has improved, —so decidedly improved as to enable them to resume operations there with more satisfaction to themselves and to their patients than the palmiest days of swaged metal ever afforded.

The writer of this communication is no advocate for rubber, according to the present method, discarding, as he does altogether, the teeth designed for that specialty; but he is an advocate for advancing the interest of his profession, and through it, of the public generally, by pressing into its service whatever may be rendered available, from any and every proper source. An experience of thirty years, during the golden age, and a familiarity (*ex necessitate*) with rubber, of six or seven, ought to enable him to pass a fair judgment on the merits and demerits of both. His experience, based on faithful experiment, is

shortly told, viz.: Rubber plate, thin, thoroughly vulcanized, and highly polished, carrying *plate teeth lined with gold, instead of rubber teeth,* constitutes a piece of mechanism as artistic and beautiful as the finest specimens in gold, with more congeniality to the human mouth; for partial cases, far superior to metal base, and for lower cases, full or partial, when properly loaded, incomparably superior to any heretofore introduced; for full upper sets, possessing all the advantages for which porcelain and continuous gum are lauded, with the important additional ones, of lightness, less bulk, and perfect adaptability, with undiminished strength to partial cases. Facility of construction and repair, comparative cheapness, and its general applicability in Mechanical Dentistry, must commend the combination (patented) of plate teeth, gold, and rubber to the profession, whenever it shall choose to avail itself of it.

ARSENIOUS ACID AS A DEVITALIZER OF THE DENTAL PULP.

BY J. FOSTER FLAGG, D.D.S.,
PROFESSOR OF DENTAL PATHOLOGY AND THERAPEUTICS IN PHILADELPHIA DENTAL COLLEGE.

(Concluded from p. 582.)

BUT arsenious acid and creasote was proven upon patients to be occasionally objectionable, and its action was shown upon frogs to be much more intense and promptly fatal. This result was suggestive of the explanation of such trouble as had been found to accrue from the use of this combination; and it was theorized that too great irritation produced too rapid congestion of the bulbous portion of the pulp, preventing, with arrested circulation, the possibility of the introduction of a sufficient quantity of the "essential principle" into that portion of pulp tissue occupying the canals of the roots, and, at the same time, inducing the pain consequent upon rapid motion and pressure of blood upon the nerve peripheries before the creasote had sufficiently penetrated to paralyze them. It therefore became necessary that a preventive to this rapid irritation should be introduced, which would combine three requisites,—bulk, solubility, and absence of irritating qualities, either mechanical or chemical. For this purpose, the acetate of morphia was suggested by Dr. Spooner, almost simultaneously with that of arsenious acid; and careful experiments have satisfied me that, as yet, no other article, so well adapted, has been proposed. Its bulk is sufficient to insure that, in equal parts by weight with the acid, only enough of the latter shall be brought in contact with the pulp, to be about one-fourth as irritating as the arsenic alone. Its solubility is such as to insure a gradual and constant renewal of the presence of the irritant; its mechanical and chemical compatibility with pulp tissue I have demonstrated again and again, before making applications for the desired devitaliza-

tion, and the average contrasts most favorably with that of any other proposed substance of which I am cognizant. The *form* of application has two classes of advocates,—those who keep their remedies dry, moistening them at the time of using, and those who prefer pastes. I think the latter form possesses every quality, as to efficacy, etc., that pertains to the former, if made of the proper consistency—which is, a paste so stiff as to *prevent* the settling of the arsenious acid through the acetate of morphia. If too thin, this will be demonstrated by layers—first and lowest, arsenious acid; next, the acetate of morphia; and, covering the top as with a glazing, the creasote.

It is conceded that the objection which has been urged against the use of sulphate of morphia—to wit, its decomposition, leaving free sulphuric acid—may have some trifling weight in the consideration of a choice between it and the acetate; but we have the authority of standard works on therapeutics for the position, that the latter salt is preferable for endermic applications; and still another reason, with myself, for its employment is, that, while in all other respects it is regarded as the better, it possesses in addition a specific gravity much nearer that of arsenious acid; and, consequently, is not so liable to interfere with the mechanical combination, which, alone, forms a paste of arsenious acid, morphia, and creasote.

I have said that a properly proportioned paste possesses, experimentally, an efficacy equal to the recently mixed dry powder and creasote; and I have thought it reason sufficient to prefer that form, from the greater accuracy with which the desired amount may be *placed in position*, either upon cotton, or with a delicate instrument, and *retained there*, particularly in upper teeth, while it is securely protected from danger of being displaced or dissolved by external agencies. The formula which I used was—

℞.—Ars. acid, gr. i;
Morph. acet. gr. x;
Ol. creasote, gtt. v.—M.

by rubbing thoroughly for fifteen or twenty minutes upon a druggist's slab, as usual in compounding such recipes. Having made the *usual sized* application, containing, as it will, about the 1-200th of a grain of arsenious acid, fairly and gently to the surface of the exposed pulp, and, having secured it thoroughly with a plug of cotton merely moistened with a thin solution of gum sandarac, I allowed it to remain for ten days or two weeks, at the end of which time I could almost invariably remove the pulp, without pain; if some sensation still existed, demonstrable by probing, *I replaced the same application* which had already been used, and gave a few more days for the completion of the process of devitalization and sloughing. It is the almost universal experience that, after an application has remained in a tooth for several days, soreness

of the organ supervenes, tenderness upon occlusion, slight pain from striking, etc., all indications apparently of periosteal difficulty; *but these same conditions are concomitants with the dying of the last portion of pulp, no matter from what cause,* and if a pulp be extirpated during the existence of this condition, it will, under the microscope, present an appearance which will clearly indicate the reason for such tenderness, in the evident absence of vitality in the greater portion of tissue, and the equally evident presence of high inflammation in that portion immediately contiguous to the apicial foramen; there will, moreover, always be pain in the extirpation of pulps at such times; *but if everything be permitted to remain undisturbed, all trouble will pass away in a few hours,* and the usual quiet and comfortable condition which we know to supervene upon the absolute and entire loss of pulp vitality will be the desirable consummation. I usually allowed an application to remain several days after this "tenderness" had passed away, knowing from experience that the external irritation consequent upon the sloughing of the pulp, at the apicial foramen, would, by that time, have been sufficiently subdued by the *vis medicatrix naturæ* to permit of dental manipulation with no risk of engendering after-trouble. This method of procedure has now stood the test of several years, with uniformly gratifying results, both to patients and to myself, and will, I think, only require a few trials at the hands of any competent practitioner to commend itself to favorable consideration. I say "competent," for, like almost all valuable remedial agents, arsenious acid is potent for good and *very potent for harm.* Much has been said of the danger of its *use*, but an extended observation and experience convince me that it is to its *abuse* that all the evil results which have positively attended its exhibition are to be attributed. I have met with three cases, and now possess the specimens, in which applications had been made *through* the roots, until the periodonteum was destroyed, and necrosis was the natural result. I have, also, in my possession, two teeth (second bicuspid and first molar) which, together with all intervening structure, were destroyed by persistent arsenical applications placed in a cavity upon the posterior face of the bicuspid; this was doubtless the result of insufficient protection, for we know arsenious acid to be somewhat soluble in water, and through the exit which would be afforded by a simple cotton or defective wax plug, the saliva would be alike the menstruum and vehicle by means of which, as shown by actual experiment, the 1-25th of a grain of arsenic, the usual amount employed, would be capable of producing most disastrous consequences. It is, therefore, neither more nor less than folly to feel secure in the direction of "deplorable results," merely from the fact that if the whole amount applied be swallowed the patient will not die! for, singularly enough, it is true that swallowing the application, cotton and all, would be the most positive way of insuring no possible harm as

the result of inability and ignorance! It is, then, a matter of much moment that an operator should possess at once a reliable degree of information as to special dental anatomy; diagnostic ability sufficient to distinguish as to whether trouble comes from the inside or the outside of a tooth, and manipulative skill adequate to the prevention of the action of agents employed, in any other than the designed direction. With these requisites, one *must* be successful in the treatment of teeth; without them, all good results are but the fruits of fortunate blundering, and all signal failures and dreadful consequences naught but what might have been reasonably expected.

In conclusion, I would state that the minutiæ of practice, as laid down in this paper, is not that used by me at the present time, various modifications having ensued as year after year has passed since the experiments alluded to were performed. The points insisted upon are—1. That the teaching of even *the most recent* issues of text-books in regard to the irritation of tissues through apicial foraminæ by arsenical applications is utterly fallacious. 2. That the statement of the solubility of arsenious acid in creasote or carbolic acid is erroneous. 3. That while it is unnecessary that arsenical applications should be left in teeth any great length of time, it is still *possible* that weeks, and even months, *may* be allowed to pass without developing any trouble. 4. That when, in any case, periosteal irritation finally supervenes, it is not due to the arsenious acid, but must be attributed to some other cause, and treated accordingly.

THE SIMPSON RUBBER.

BY F. K. CROSBY, D.D.S., LYNN, MASS.

THE following advertisement appears in the last number of the *Dental Times:*

"IMPROVED DENTAL RUBBER, $6.00 PER POUND.

"(Simpson's Patent, issued October 16th, 1866.) Manufactured by A. R. Hale. The following guarantee accompanies each box containing a pound of the rubber:

"*Guarantee.*—The undersigned hereby agrees to, and with the purchaser of this package of dental rubber, that he will, in consideration of such purchase, protect such purchaser from all loss, cost, or damage arising out of any suits in law or equity, brought against him, under the patent laws of the United States, for using the same for dental purposes, and will defend against any and all such suits, at his own expense, upon reasonable notice and demand.

"(Signed) A. R. HALE, *Manufacturer.*"

It is time this imposition was exposed.

The dental profession has been so constantly harassed by its unfortunate subjection to the will of a monopoly in relation to the rubber patents, that it were not surprising if it should seize at any opportunity

which might promise emancipation from its control. To give such information as may prevent the profession from being deceived by the specious offer above quoted, is the object of this communication. In furtherance of this aim, the writer may be pardoned for narrating his personal experience in connection with the Simpson rubber.

Early last spring, when the agent of the Goodyear Dental Vulcanite Company called for the purpose of collecting the license fees, the writer, together with Dr. Aspinwall, of this city, refused to take out licenses as demanded, on the ground that we had abandoned the Goodyear rubber, and were using Simpson's exclusively. We were of course led to take this step by the offer of protection against "loss, cost, or damage arising from suits" contained in the guarantee.

About the first week in March we received notice to appear at court to show cause why an injunction should not be granted against us, as prayed for by the Goodyear Company. I telegraphed to the signer of the guarantee, to ascertain whether he would be on to defend our case, and received in reply the following telegram:

"BRIDGEPORT, CONN., *March* 18, 1868.

"The cases on Saturday are arranged for.

"A. R. HALE."

In accordance with a request sent on by Hale's counsel, H. T. Blake, Esq., the court postponed the matter until the 4th of April. In the mean time, by the instruction of Mr. Blake, we prepared affidavits, setting forth the peculiarities observable in the Simpson rubber. When the appointed day came, neither Hale nor his counsel made his appearance in court, and the injunction was granted by default.

From the peculiar wording of the writ of injunction, we were in some doubt as to whether we were restrained by it from the use of the Simpson as well as of the Goodyear rubber. Dr. A. therefore wrote to Hale, and myself to Mr. Blake, stating the question. I give Mr. Hale's reply:

"BRIDGEPORT, *April* 8, 1868.

"DR. ASPINWALL.

"*Dear Sir*,—In reply to your favor of the 6th, I have to say that it depends upon the injunction. If it does not speak of the Simpson rubber, I think you can use the Simpson rubber until it is proved to be an infringement.

"Respectfully yours,

"A. R. HALE."

But the lawyer, more astute or less unprincipled than his client, did not venture to suggest a violation of the injunction, but counseled submission, as follows:

"BRIDGEPORT, *April* 7.

"*Dear Sir*,—In our *opinion*, the Goodyear rubber is not identical with the Simpson rubber; but as the injunction was probably designed

by the court to cover the Simpson rubber, you would incur a risk in using the latter unless you could satisfy the court that we are right in our distinction.

"We were obliged, by the multiplicity of suits, to select one as the *test case*, and not attempt to defend the rest. We propose to test the questions at issue between us and the Goodyear parties in the case against Dr. Evans, of New York. The decision in that case will govern yours, and until you learn what it is, you will not be prudent in disregarding the injunction.

"Yours, etc.,

"H. T. BLAKE."

I then wrote to Mr. Blake, asking the length of time that would elapse before the decision of the Evans case, and also asked whether I was not right in supposing that Mr. Hale was liable for the costs already incurred. *To that letter I have never received a reply.*

As the stoppage caused by the injunction was injuriously affecting our business, and as we could get no information concerning the Evans case, we decided to abandon the matter, and take out licenses from the Goodyear Company, upon which, and the payment of costs, the injunction was dissolved.

I then wrote to Mr. Hale, inclosing bill of costs paid by me, and requesting reimbursement, according to the terms of his agreement to defend against "loss, costs, or damage." To that and to subsequent demands I have to this day been unable to get an answer.

To show the *animus* which has actuated the proprietors of the Simpson rubber, I insert the following circular, which they sent to the dental profession, relative to another case:

"*To the Dental Profession.*—In the case of Henry B. Goodyear Dental Vulcanite Company *vs.* Dr. J. Brockway, of Albany, which was a suit for using hard rubber for dental purposes, before the U. S. Circuit Court for the Northern District of New York, an application for a preliminary injunction to restrain the doctor from further use of the article pending the suit was set down for a hearing on Tuesday, January 28, at Albany. The motion was resisted by defendant, on the ground that he was using the Simpson dental rubber, and not the Goodyear rubber, or any infringement of it. Chas. F. Blake, Esq., of New York, appeared for the owners of the Goodyear patents, and H. T. Blake, Esq., of Bridgeport, for the owners of the Simpson patent. Affidavits had been prepared on behalf of the defendant, disclosing the fact that the Simpson rubber is entirely different, both as a material and in its mode of manufacture, from the Goodyear article; upon the exhibition of which the counsel for the complainants notified the court that he should decline to press the motion at present, as he had intended, and requested and obtained an indefinite postponement of the whole matter.

"Porter Manufacturing Company, Manufacturers of Porcelain Teeth, Bridgeport, Conn., General Agents for the United States for the sale of Simpson's Rubber. Price six dollars per pound."

The truth of the matter, as I am informed by the Goodyear Company, was this: when the above-mentioned case came into court the counsel

for the Simpson rubber asked, as a favor from the Goodyear counsel, that he would allow him more time, as he would then be able to have additional affidavits which would enable him to show that his rubber was a different article. The request was granted, and, as a favor to Hale's counsel, the Goodyear counsel moved for a postponement. The agents of the Simpson rubber immediately got out and distributed the circular above shown, conveying the impression that the Goodyear counsel had asked for an indefinite postponement of the whole matter from a knowledge of the weakness of his case. The circular was true as to the letter, but in spirit false.

In the Evans case, the court, shortly afterward, decided the Simpson rubber to be an infringement, but we never received any notification of it from Hale.

And now, in the face of the fact that the court has decided the Simpson rubber to be an infringement, and in face of the fact that parties who trusted in the good faith of the agreement have been deliberately abandoned, and their demands for compensation ignored, advertisements to-day appear with the same guarantee, promising protection to those who will pay six dollars a pound for the rubber.

If the dental profession has not already been sufficiently swindled by its connection with the rubber patents, it may here find a promising opportunity ready to its hand.

REMARKABLE TOLERANCE OF PINS STUCK THROUGH A TOOTH INTO THE ALVEOLAR PROCESS.

BY J. J. JACKSON, D.D.S., COXSACKIE, NEW YORK.

THOMAS BURROUGHS, aged thirteen, by accident broke off the greater part of the coronal surface of the second right lower incisor. The obliteration of the nerve of the tooth soon followed, without causing much pain. About six months after the accident, the boy, with a pin, discovered the pulp cavity, and thrusted with great force a pin through it into the alveolar process. In trying to remove it, he broke it off, leaving the long end of the pin in the tooth. Two weeks after this, he took another pin, and inserted it by the side of the one in the tooth, and with his upper incisors firmly and entirely imbedded it into the cavity of the tooth, leaving no part of it exposed, except the head.

These pins remained in the tooth, with the points penetrating the lower jaw, for six months, without causing much pain or inflammation. After the trick was discovered by his mother, he was sent to me to have the tooth extracted. I extracted it, and found that the first pin had penetrated one-quarter of an inch beyond the root of the tooth, and the other about half an inch. The pins were considerably oxidized,

except the points that were imbedded beyond the root of the tooth. There were neither indications of inflammation nor suppuration about the root of the tooth. The pins had split the root to the extent of nearly three-eighths of an inch.

The following figure shows the appearance of the tooth:

The specimen I presented to my friend Dr. G. P. Hachenberg, of Hudson, New York, late Surgeon of the United States Army, who received it as a pathological specimen for the National Medical Museum, at Washington. The doctor being a physician of learning and experience, in presenting him the tooth, I asked him the following questions:

1. When was the root split?

2. Why did not the infradental nerve suffer from the presence of the pins?

3. How was the nerve of the tooth destroyed without odontalgia?

4. Why was there absence of inflammatory action?

5. Why were not the points of the pins oxidized?

6. The points of the pins lodging so long in the inferior maxillary, are bad effects likely to follow?

The following is an extract of his letter, which I take the liberty to give you:

"The tooth with the two pins in it I received, and read the history of the case with much interest. In regard to the questions you propounded, they involve some fine points, in pathology in particular. I am not prepared to answer you fully; but, in a few words, these would be my views on the questions under consideration. You have studied well into the novelty of this case, and it will be more my opinion than information that I will be able to furnish you.

"1. The tooth was not split when the pins were forced into it. Their presence excited ostitis, undue pressure followed, and then the split took place.

"2. The ganglion of Gasser, at the terminus of the trigeminus, does not always afford a uniform sensibility to the trigeminal system of nerves; in the strumous constitution in particular. The preponderance of nerve-force in that habit usually lies in the ophthalmic. It may even exist there, or the superior maxillary, as a local peculiarity of its own, free of any morbid action. Under these circumstances, the inferior dental on the laws of revulsion is but little predisposed to morbid sensibility.

"3. This is a reason why some people never have toothache, or may have it only in affected teeth of the upper jaw, but never in the lower, and *vice versa*.

"4. As innervation peculiar to the first stage of inflammation could not take place, for reasons already given, inflammatory action could not set in, even in spite of the presence of a foreign body.

"5. As the points of the pins afforded comparatively little pressure on the living tissue, it caused little or no disorganization; therefore what oxidation did take place in the form of the oxide of tin the immediate absorbents removed, owing to the solubility of the salt in serum, leaving the points bright. Not so with the body of the pins; their pressure caused disorganization of the adjacent tissue, which in return oxidized the metal, but could do nothing in removing it.

"6. I would apprehend no bad results; still if the ends of the pins wounded the inferior dental, and caused even a slight change in the structure of the nerve, it may at one time serve as a nucleus to such disease as either the parts or the general system may be predisposed to, such as a neuromatous or cancerous growth.

"Pins and needles imbedded in the cellular and muscular tissue, when not disturbed by muscular action, usually produce little local disturbance. They almost invariably produce mischief when kept in contact with the serous structure or bones. The *momentary* insertion of fine needles, as the acupuncture needles, is with impunity tolerated in all the soft tissues of the body, even the heart and the brain not excepted."

THE DENTIST AS AN INSTRUCTOR.

Read before the Chicago Dental Society.

BY M. W. SHERWOOD, CHICAGO, ILL.

I HAVE chosen for my theme, this evening, "The Dentist as an Instructor."

The sin of the world is ignorance. We see this saying exemplified every day, in our professional walks. Only one other profession, I apprehend, comes into such close and open contact with the ignorant prejudices of the people as the dentist. Often he finds himself baffled, in his best endeavors for the good of his patients, by stubborn ignorance. What is he to do in these cases? I answer, enlighten and instruct on the instant. Now, in order to instruct others, he must first *know* himself.

Herein it is that the dentist should be knowing and enlightened. Herein is it that he must always be a student,—a close observer of nature, and all the phenomena that come under his observation, particularly in his operations upon the natural teeth. The American dentist has more of a task to perform than merely to make money—to get rich, or even to get a competent living. He has to improve and better the teeth of the nation, and to teach all that come within the sphere of his influence, how to preserve them. This is a great and honorable task—I may say duty. How can it be accomplished, save by educating the masses? Here lies the duty of the dentist to educate. It is sometimes the pleasure of the operator to meet with patients that know the

physiology of the teeth,—that know deciduous teeth from permanent ones; but how few and rare such patients are! Physiology is beginning to be taught, to some small extent, in our public schools; and, for my part, and for the practical benefit to the rising generation, this teaching ought to begin with the teeth. But it is not the children, for the most part, that come to our offices. Therefore is it, that it is a duty to begin with the first ignorance we meet, and correct it. Is it a fashionably-dressed mother who says her father had, every one, double teeth all around? And she can't understand why it is that her children's teeth decay so. She has brought her little daughter to have you look at her teeth; but promptly declines to have the six-year old molars filled, because they are shedding teeth. She knows, for she shed the same teeth. Therefore it is useless. Ask her, blandly, how many shedding teeth the child invariably has, as a natural law. And I have never yet met one that could tell. Convicted of ignorance, she will listen to instruction.

Is it a poor boy, a son of toil, that comes in to get an aching tooth extracted? At a glance you see that he never used a tooth-brush. Tell him: "My boy, you must brush your teeth every day, and keep them clean, or you will lose them all." Is it the son or daughter of wealth, too indolent or unmethodical to properly cleanse their teeth? Have we no instruction to give such. And so on, through the whole catalogue of patients. A word, it may be, is all that is required.

To me, the study of the human mouth has ever been a great pleasure. No two sets of teeth in nature are alike. The endless variety of expression is wonderful,—countless as the flowers of the field, and as beautiful.

To me, the inspection of a perfect set of teeth, full and well developed, in a healthy and manly boy, is a pleasure akin to that of inspecting a casket of jewels. "A thing of beauty is a joy forever." Have we no word of instruction for the joyous owner of such priceless jewels? So of the radiant maiden,—the flower of her race, rare as the rarest bird, hardly ever seen, in these days, with perfect teeth. But when met with, is there a profound pleasure more exquisite than the inspection and care of such a case? Have we no advice and caution for these loved ones? Even ages ago, in the City of Jerusalem, the wise man taught the lovely maidens of his time, and for all time, a lesson about the beauty and value of their teeth. The best and wisest men of all ages have been teachers and instructors. The dentist has peculiar and favorable opportunities of imparting instruction. He has the ear of the patient. How wrong is it that he should fill it with self-praise! How much worse, that he should fill it with disparagement of his neighbor!

Instruction should never degenerate into egotism, or be made unpleasant or disagreeable. The great teachers, in all ages, have been the great-

est of men—gentlemen, in the true sense of the word. The medical profession has, in past ages, hid knowledge from the mass of the people —locked it up carefully in dead or ancient languages, and thus preyed upon and profited by the ignorance of the people.

But such should not be the case with the modern dentist. Latest and youngest of the professions, its true and highest interest is instruction of the masses. Therefore, my brethren, let us instruct, in season and out of season, here a little and there a little, always remembering that words fitly spoken are like apples of gold in pictures of silver.

POISONING FROM ARSENICAL APPLICATIONS.

BY JOHN D. MILES, VICKSBURG, MISS.

THE object of this communication is to call attention to a question alike important to the dental profession and the community.

In destroying the pulp of a tooth, my usual practice has been to combine arsenic, in very small quantities, with other remedies. The point in question is this: can arsenic, in minute quantities, properly inserted in the cavity of a tooth, and duly protected by cotton, be sufficiently absorbed, and taken up by the circulation, to poison the patient?

A practical experience of eighteen years furnishes only one case that appears to indicate an affirmative answer. It is as follows: A white girl, aged twelve years, applied to the family physician to extract a tooth,—the left inferior first permanent molar. Not caring to perform such operations, he brought her to me. Upon a careful examination, I suggested the propriety of destroying the pulp, as the tooth could be made to do good service for several years. I applied the usual remedies, in connection with a minute quantity of arsenic, secured in its place by cotton which completely filled the cavity of decay. I strictly charged the girl, on leaving my office, to remove by night, all I had put in her tooth, and then, in case of pain, to use a little laudanum.

At eight o'clock that evening the family physician was sent for. Judging from her symptoms that she had been poisoned by the arsenic he had seen placed in the tooth that day, and which had not been removed, he administered the usual antidotes for arsenic, with the desired results.

In giving me the history of his treatment, the physician said that, from the fact that his patient had had bloody discharges previous to the application of the arsenic, and a fever afterward, her violent vomiting could not have been caused by arsenic alone, as she probably had an intermittent fever, with slight congestion of the bowels. His opinion was strengthened by the fact that the girl was living in a malarious district, and quinine was

necessary to her complete restoration. This statement seems to leave the impression that the arsenic, if not the immediate agent, was a remote one, of the girl's illness. But as there is a doubt, its weight should be cast on the negative side.

In connection with the above, it may be said that the constant employment of the arsenical paste during the past thirty years has fully demonstrated that, when carefully applied to an exposed pulp and confined in the cavity by cotton, combined with wax or gum sandarac, no constitutional disturbance can be induced. The *very small* quantity of arsenic *reported* to have been used in this case, even if it had been swallowed, would not have been likely to induce the supposed symptoms of poisoning, which were coincident with, rather than the result of the application.

In conclusion, it is not good practice to intrust the removal of an arsenical application to a patient, particularly a child; too much care, indeed, cannot be exercised in the application and removal of the paste by the practitioner. J. H. McQ.

PROCEEDINGS OF DENTAL SOCIETIES.

ODONTOGRAPHIC SOCIETY OF PENNSYLVANIA.

BY T. C. STELLWAGEN, M.D., D.D.S., PHILADELPHIA.

A STATED MEETING was held on Tuesday, November 3d, 1868, in the Philadelphia Dental College building. The President, Prof. McQuillen, in the chair.

The minutes of the previous meeting were read and approved. The following gentlemen having been presented as candidates for membership, they were unanimously elected:

Louis Jack, D.D.S., active member; C. E. Francis, D.D.S., Wm. C. Horne, D.D.S., E. A. Bogue, M.D., corresponding members; Prof. S. B. Howell, M.D., honorary member.

The Librarian reported the receipt of a copy of Taft's "Operative Dentistry," as a donation to the Society from the President.

Dr. Nones, the Curator, reported the receipt of some specimens of exostosed teeth, from Dr. B. T. Beers, of Morrison, Illinois. The same gentleman also exhibited a skull that had been exhumed in a cut made for the North Pennsylvania Railroad: it presented a fine example of the peculiar perforation made by a bullet passing through the cranium at a high velocity, making an almost perfectly round hole where it *entered*, while the point of *exit*, on the other side of the skull, was marked by the greater injury done to the surrounding hard tissues by the ball, which had lost much of its initial force in overcoming the resistance it had

already met with in its course. The teeth and skull were passed around for examination and drew forth some remarks from the members, all being pleased to find the interest manifested by their professional brethren in the attempt to collect material for a society cabinet.

The Chairman of the Committee of Conference on the formation of a State Society read extracts from letters received from Drs. H. Gerhart, of Lewisburg; W. K. Brenizer, of Reading; S. H. Guilford, of Lebanon; and Jno. McCalla, of Lancaster; all of which were cheering to those interested in the movement.

A form of address to the dentists in the State was presented to the Society and approved. The suggestion that the Society should nominate and elect delegates to be present and represent this organization in the convention, the same to retain their office, for whatever may be decided upon as the regular stated term of membership in the State Society, having been favorably received, the committee, at their own request, was discharged. The election of delegates resulted in the choice of the following active members:

Prof. C. A. Kingsbury, Drs. Wm. A. Breen, C. M. Curtis, Wm. C. Head, Wm. P. Henry, M. Lukens Long, J. W. Moffit, S. S. Nones, Thos. C. Stellwagen, and Ambler Tees.

The President, after the election of the delegates, remarked that an event of such importance as the formation of a State Dental Society not only called for an active co-operation on the part of the members of this Society in the furtherance of that object, by taking part in the deliberations of the convention, but in addition, some provision should be made for extending to our professional brethren from the interior of the State those courtesies and attentions which are meet and proper on such an occasion; as, for instance, a social gathering of the members of our own and other liberal professions during the session of the convention. The appointment of a committee to take this matter into consideration would appear to be the most appropriate method of determining upon such steps as may be deemed advisable.

A motion being made and carried that a committee be named for this purpose, the following were chosen: Prof. Kingsbury, and Drs. Henry and Nones.

Dr. Moffit, of Harrisburg, made a few remarks, calling upon the members of the Society to endeavor to discover some base for artificial work that would entirely supersede vulcanite and thus rid the profession of what he felt was a disgrace to it.

The President said that as the hour of adjournment had nearly arrived, he would take the liberty of suggesting the appointment of a committee to inquire into the feasibility of having one or more lectures delivered under the auspices of this Society.

On motion, Drs. Stellwagen, Breen, and Curtis were chosen to examine and report on the feasibility of this suggestion.

The Society then adjourned to meet on Tuesday, November 17th, at the same place.

An adjourned meeting was held at the Philadelphia Dental College, on Tuesday evening, November 17th, 1868, the President in the chair.

The following gentlemen were reported upon favorably by the Executive Committee and duly elected: S. T. Beale, D.D.S., Geo. P. Franklin, D.D.S., and Wm. H. Howard, D.D.S., for active membership.

The result of the ballot was unanimously in favor of the candidates, and they were declared to be members.

A paper was then read upon "The Moral Effects of Remedial Agencies," which was ordered to be printed, and which is as follows:

MORAL EFFECTS OF REMEDIAL AGENCIES.

BY THOS. C. STELLWAGEN, M.D., D.D.S., PHILADELPHIA.

No one will dispute that the first aim of all practitioners of our profession should be to alleviate pain and suffering; success in this will almost insure that pecuniary return which, although secondary to the former, is highly important for our sustenance in the battle of life.

The many operations that the dentist is called on to perform, which in themselves are objects of dread and real suffering, make it doubly useful for us to be thoroughly acquainted with all proper agents calculated to aid in stripping our manipulations of torturing impressions; and the imperfectly understood expanse (that lies between mind and matter) promises a glorious yield to the earnest laborer. It is not to be supposed that these remarks are addressed either to those who are ignorant of the palliatives, sedatives, narcotics, anæsthetics, or any of the classes of remedies of the Materia Medica, nor of the most approved methods of using them; but, by recalling to mind the moral power held by the intellect of the physician over that of the patient, it is proposed to make this the special object of study, so that each individual present may add to his information by the interchange of ideas with his fellows.

While the healing art was in its earliest infancy the moral effects of remedies seem to have been the principle by which most diseases were managed; or rather the means of support to the spirits of the patient during the time he underwent nature's course of repair. A moment's regard of the physical treatment of that time will show that, as at present in the most ignorant communities, it was often better calculated to kill than cure. As science advanced, this great domain for distinction seemed to be more and more abandoned, until at one time it might almost have been feared that by quacks alone was it to be taken into consideration.

The study of physiology has demonstrated the importance of gaining

a favorable condition of the mind for success in practice, and to attain this many remedial agencies have been directly employed.

Pereira, in his work on Materia Medica, divides remedies into psychical, or those which operate through the agency of the mind, and somatical, or those which act on the body directly; although in a foot-note he seems to consider that it may be inaccurate, since he says: "Changes in the condition of the brain produce corresponding alterations in the state of the mind; and it may be fairly inferred that changes in the state of the mental faculties are necessarily associated with some molecular alteration in the cerebral substance. If this be true, all remedies are somatical or corporal."

The principal, or in fact almost the sole way of obtaining the mastery, or control of the moral affections, is through the medium of the senses: these natural avenues to the mind should ever be carefully guarded and used by both the physician and the nurse.

In our duties it is generally proper to assume the rôle of both physician and soother—at least the latter for the feelings of a timid or nervous patient; in this we are often aided, although sometimes retarded, by a relative or friend of the person under our charge, and hence it is not only for us to judge of the propriety of any attendant being at the chair, but at the same time to choose one from among those who may present themselves, according to fitness to act in this capacity.

As a general rule, it would perhaps be well to remember that a certain amount of force is demanded of the operator, to control the actions and feelings of those in the office. In point of economy of force if for no other reason, it is best that he should be in a separate apartment with his patient, and frequently it is better that he should be the only one to attract in any way the senses of the subject of his manipulations. This is so generally recognized that few operate in the same room in which the persons applying for relief are received; but all, if convenient, have an office exclusively for this purpose. Of course a favorable impression should be desired, even before the patient has the first interview, and this must be trusted to the general reputation of the dentist and the appearance of both the exterior and the interior of his apartments.

It is useless to mention any method by which to gain the personal control needed—every school-boy would be aware that knowledge and self-reliance are indispensable; they can only truly be obtained by the possession of a thorough education, which is difficult and expensive to acquire, and even once fairly within the mental grasp, the constant study of all the improvements continually being made known, is requisite to maintain a high position. The seductive languor that so often falls upon poor mortals, must ever be guarded against as the greatest enemy; while a good constitution and robust health are both of the utmost service, to enable one to go through with credit the daily round of drain upon the vital force.

Too great a care for the cleanliness of the instruments and everything that comes in contact with the patient, directly or indirectly, together with an air of comfort, both in the office dress and person of the dentist, is seldom seen. Our services are generally only required by the most delicately organized; a short experience in practice will soon acquaint one with the importance of quiet and cheerful surroundings. The wearying time spent by the expectant sufferer, should be cut down to a minimum by a strict regard for punctuality in fulfilling engagements. If it should happen, as it often does, that the patience of the person to be operated upon must be taxed, means to agreeably employ the mind should be at hand; of these the various periodicals of the day present a vast magazine to draw from, to which may be added the current literature of our language, painting and the fine arts in general, together with a thousand and one minor articles, each perhaps small in itself, but by their variety and combined effect producing the desired distraction of the thoughts from the object of the visit, while at the same time they may combine instruction and improvement.

When receiving the patient, need it be told to any but the most unfeeling, that true and unconcealed tenderness, together with a due amount of assurance that the anticipation is worse than the reality, is the duty of every operator? It will almost invariably be found that, by commencing with the more simple manipulations, we overcome much dread and repugnance; in fact, it seems that, with the generality of mankind, the first visit or engagement had better be short, and little real import given to the actual amount of physical work accomplished. During the time of the interview the most sedulous care should be exercised to prevent the infliction of pain; in this we may be aided by the constant use, if necessary, of the proper remedies; and in passing it may be well to mention that, if the party under our hands should not prove to be in a favorable condition of both mind and body, it is of great service to prescribe such a course of preparation as may be best qualified to bring about the desired healthy or even vigorous state.

In addition to the narcotics, the sedatives, and, indeed, all remedies commonly used by the dentist to allay nervous irritation and hyperæsthesia, it seems that the bromide of potassium, so universally employed in medicine, as yet but little tried in dentistry, has so many valuable qualities ascribed to it, that it would seem to meet sufficient requirements to make it a desirable remedy for our treatment on general principles. The proper diet, together with exercise in the open air and sunshine, being of all the most natural and effective, are so clearly pointed out by nature herself in many instances, that it is a source of wonder that they are not more frequently ordered,—especially when of all these preventive means, they are so readily attainable, it seems that no valid excuse can be offered for the neglect to make them of avail.

As to the administration of the medicines, I feel assured that small and oft-repeated doses are in many cases the most happy in their operation, as they incline to the belief that every repetition is doing good; which really disposes the mind to a hopeful and eminently favorable action. In the practice of medicine this is most evident, being dictated in an unmistakable manner by the constant desire of the sick to have something done for them. I have seen the moral action following the use of minute quantities of sugar of milk, or colored alcohol, diluted in a tumbler of water and given in drachm doses, produce the most happy effects; and when these little attentions are paid, even in grave disorders, they are, through the power over the mind's action on disease, really potent, whether prescribed for a cystitis or a pimple.

In the diseases of infants the hourly or half-hourly dose of a teaspoonful of water seems to be most welcome to the little one; and while it allays the burning thirst, with which they often suffer, it nourishes the tissues, and if apparently medicated, it disposes those around to continue its use, with the calm and confident state of mind so important for nurses to possess, so as to allow the healing power of nature, which is so vigorous in the young, to carry on its busy work untrammeled.

No doubt a smile will be excited when I gravely assert that in a case where the bromide of potassium was ordered to be taken for urethritis, the prescriber was the one to set it aside and give sugar of milk, the name of which he did not, like the former, allow to be known. Eighteen hours after, the patient assured me that he was much relieved from his agony, and asserted his conviction to the belief that if he had taken it earlier he would have been cured.

This, however, brings me to the mention of a most happy truth, first disclosed to me by a member of the medical faculty (celebrated for his successful treatment, especially in the more difficult cases of nervous and delicate females), to whom I am indebted for the realization of the important fact that the remedies prescribed, prepared, and administered by the practitioner in person, are almost invariably taken by the sick with that childlike faith in the certainty of the beneficial effect to be looked for, that is so happily conducive to a relief of any suffering. For this reason, if none other, it seems advisable that whenever it may be practicable, the attending physician should assume, at least to a limited degree, the duties of the apothecary.

Who may dare to neglect those little sympathetic expressions and actions which often make the pain we are forced to inflict, at least bearable, while at the same time we gain that understanding or *rapport* which must exist between the afflictor and the afflicted, if the labor is to be most remunerative to either. I have often watched an operator, who is here in our midst, as he relieved his patient from the annoyance of a stray hair, which would tickle and perplex the party to get rid of

it; and the thought has ever come up in my mind, that as straws show which way the wind blows, so attention to even such trifles does much to show a true appreciation of the golden rule and an intimate knowledge of the feelings of humanity.

It cannot be too often reiterated that in excavating the diseased tooth structures, sharp-edged instruments and the observation of the rule to cut from, rather than toward the pulp, have, after a long trial, always encouraged the belief in the efficacy of this mode for avoiding unnecessary pain.

With this, however, I must close the introduction of a subject which you have no doubt found tedious, not from its intrinsic poverty, but the unfortunate choice you made in the essayist.

Prof. Kingsbury had been suffering from periostitis. Physicians die, ministers sin, and so dentists sometimes may suffer from odontalgia He mentioned his suffering as an excuse for the brevity with which he would treat this interesting subject, as the moral influence that this pain exerted was a practical example of the matter under consideration. Many cases occur in dental practice where there is a demand for this moral treatment and no matter how tenderly we may express our sentiments of regard for the patients' comfort, we may meet with failures; especially is this the case with children. Only a short time since he had one, a little patient eight years of age, for whom he inserted between twenty and thirty gold together with some temporary fillings. The operator and the child's father were both pleased with the success they met with in the management of the child; but the younger daughter, who was only about six years old, proved extremely difficult to control; she had eight deciduous teeth in a condition requiring attention. The child, in her first visit, watched every movement; he only partially excavated some of the teeth, but found it almost impossible to do anything for her. He finally allowed her to return home, upon a promise that she would come to his office at some other time. This was one of those rare cases in which he found himself nonplused.

Dr. Long said that the mention of cold water suggested to his mind the application of a steady stream of it to relieve periostitis.

Dr. Nones thought it well to occupy the minds of his patients in an ante-room. He had always avoided all displays of instruments, or anything reminding them of the pain to be inflicted; he found that it was improper to operate excepting when the mind was in the proper frame, he having the confidence of the patients.

Dr. Stellwagen said that the subject had frequently been suggested to him from the contemplation of effects produced on audiences by certain peripatetic lecturers, styling themselves mesmerists, magnetizers, or psychologists, who, although generally men of a limited degree of education, were dealing with a matter which possibly might at some

future day be reduced to a science. Be that as it may, it was of sufficient interest to any operator to demand attention, and most of the physiologists of the present day have made some investigations with reference to it.

Prof. McQuillen remarked that we sometimes hear professional men complain of want of success, even when they are possessed of a remarkable degree of learning and ability to perform the tasks they have undertaken. This generally indicated the absence of that peculiar moral power which is necessary for the advancement of a man in any of the walks of life, and so indispensable in practitioners of the healing art. Through the possession of this in an eminent degree some are able to exert a marked control over their patients. It is not only necessary to know *how* to operate, but, in addition, *when* to do so; in illustration of this, a lady came under his care for the performance of a difficult and delicate operation, who was so apprehensive of an accident that he declined operating until she should be in a different state of mind. The walls of the tooth were extremely thin, and of course liable to fracture in the event of the slightest movement of the patient. On a subsequent occasion manifesting the most implicit confidence, the operation was performed, and proved a complete success. This, as an example of the moral influence, the unbounded confidence that the patient must feel in the ability and willingness of the operator, was of moment in connection with the subject. Practitioners of medicine often find their patients are cured by the mental effect induced by their visits and the knowledge of being under treatment, rather than the mere treatment itself.

The same gentleman then exhibited, under the microscope, specimens of the *Plumatella Repens* and *Rotifera* which had been furnished to him from the aquarium of his friend, Dr. Kenderdine; he referred in a general manner to the habits of these animals, remarking that the *Plumatella Repens* was a *Polyzoon* or *Mollusc* found attached to aquatic plants in ponds and rivulets. Its name was derived from the feather-like crown of tentacles, which are withdrawn into the body on the slightest agitation of the water, and not venturing out until perfect quiet is regained. This was made evident to the members by striking the table on which the microscope rested, whereupon the tentacles were immediately withdrawn, and then cautiously and slowly protruded by the animal. These movements, and those of the wheel-like projections of the body, jaws, and teeth of the *Rotifera*, excited considerable interest on the part of the members. Attention was directed to the method in which these minute animals obtained, masticated, and digested their food.

The Society then adjourned, to meet at the same place on the following evening, to hear a lecture by Prof. A. Melville Bell, of the University of London, England, on "Visible Speech."

DENTAL SOCIETY OF THE STATE OF MARYLAND.

BY S. M. FIELD, RECORDING SECRETARY.

The regular monthly meeting was held October 29th, in the rooms of the Association, in Baltimore, Dr. J. B. Bean, the President, in the chair.

After the transaction of the usual formal business, the discussion and vote on the fifth of the propositions of Dr. Arthur came up—the propositions being as follows:

1st. That caries will attack the proximate surfaces of all the teeth, except the inferior incisors, of the great majority of persons of the better classes in the United States, at the present day.

When caries of the superior incisors occurs, on the proximate surfaces, previously to the twelfth year, its occurrence, sooner or later, on the same surfaces of all the teeth, except the inferior incisors, is almost certain. In the greater number of such cases the caries will show itself before the twenty-fifth year. This predisposition to dental caries is greater in the female sex.

2d. That caries is not liable to occur, at the points indicated, unless the teeth are in contact.

3d. That an artificial, permanent separation of the teeth will arrest superficial caries, or prevent its occurrence, if the attack has not actually begun.

4th. That it is a popular fallacy to suppose that caries necessarily follows the removal of the enamel.

5th. That the most efficient means of preserving the teeth is to anticipate the attack of caries by separating them, when it is ascertained that caries is likely to occur on the proximate surfaces.

It was moved that the discussion be deferred until the November meeting, and finally changed to the December meeting.

Dr. Arthur then said:

Mr. President,—The propositions offered by me at the January meeting of this Society, as the members present are aware, came up for discussion, as agreed upon, at the meeting held in June. At the termination of the discussion on that occasion (if the little then said deserves the name), I requested that no vote should be taken upon the propositions in question, but that action should be deferred until the next regular meeting, so that a further opportunity might be afforded to any one who might undertake to do so, to show the unsoundness of the views embodied in them, if they could not bear close scrutiny.

At the meeting referred to the propositions were taken up *seriatim*, slightly modified, and, with the exception of the last, unanimously indorsed. Several members present, however, expressed some reluctance to give their unqualified approval of the last proposition, and desired that an opportunity should be afforded for its fuller discussion. I proposed,

therefore, that the matter should be deferred until the present meeting. I did this, not because I entertained any doubt about the entire truth of the proposition referred to, which is really an inevitable sequence of those which precede it, but in order that the plan of practice I propose should be subjected to the most searching examination. It has now been determined still further to postpone the discussion until the December meeting, and for the reason stated this action meets with my entire approval.

I beg to say again, Mr. President, as I have before said, that the method of treating dental caries, indicated in the propositions before the Association, is not a crude or immature idea, but is the deliberate conclusion arrived at, as the results of a long series of careful observations, and tested fully during a number of years in actual practice.

I urge these views, earnestly and persistently, only because I am deeply impressed with their great importance. It must be evident that I have no personal objects to accomplish in pressing this matter. I would not, I assure you, walk across the street to induce any one to adopt or to favor any opinions of mine, merely as a matter of personal gratification. But the method of practice I propose, if it be correct, ought to engage the earnest attention of every dentist who has any desire to practice his art for the good of the public, as it is claimed for it that a great amount of suffering will be prevented by its general adoption. If it is erroneous, its fallacy should be exposed. If it is erroneous, I am doing great injury not only in my own practice, in which for a number of years I have been pushing it vigorously, but I am misleading a number of men in the dental profession who have come within my influence, and I shall certainly continue to press it in every possible way.

But although the views of practice referred to have been before the dental profession for some three years, there has as yet been no attempt made to controvert them in any public way at all worthy of notice.

Shortly after the publication of the monograph referred to, it attracted the attention of Prof. H. R. Noel, of the Baltimore College of Dental Surgery, and was reviewed by him very fully in the *American Journal of Dental Science*, in Nos. 3, 4, 5, 6, and 7, of vol. i., 3d series.

It has been sneeringly said that he was in this case writing about a subject with which he was not well acquainted; but I think any well-informed and candid dentist, who reads the whole of Prof. Noel's articles, will admit that he has furnished one of the ablest *résumés* of the various theories of dental caries that has yet appeared.

It would be well for the dental profession if those who undertake to enlighten it, by their contributions to the journals, would make themselves as capable of discussing the principles upon which it is based as Prof. Noel.

There is but little doubt, however, that what I mean is not generally understood by members of the dental profession so far as my views may have attracted their attention. One of my old professional friends declares to me that he can account for my views only on the ground of "lunacy." A sapient critic, who occupied the position of chairman of the "Committee on Dental Literature" of the American Dental Association, at its late meeting, pronounces the views presented in my little work on "Dental Caries" "*peculiar* and *antiquated.*" Certainly a very remarkable and original combination; for how my peculiarities of opinion can be identical with the views of my ancient *confrères* in the dental profession, I am not able to understand. I am, at the same time, quite as unable to understand how any man of ordinary intelligence, who has practiced dentistry a single year, can fail to comprehend, on reading it, what the little treatise referred to does mean. It was not written, it is true, for the dental profession; but for that very reason was made so simple in its statements and arguments as to reach the comprehension of persons who had not given the subject any attention at all. I have not conversed with any intelligent person, outside of the dental profession, who has hesitated to accept the views referred to as beyond dispute. If this matter could be comprehended by persons not acquainted with dentistry, it seems unaccountable that those who are informed on the general subject should be the last to understand the full scope of the ideas I have advanced.

The general impression seems to be, that I have advised the indiscriminate filing of sound teeth as a preventive of caries, or separation, by the means of the file, of all the teeth in contact of every young person who comes under my professional care. I have advised no such thing, and the whole tenor of the argument of the little book referred to is simply to prove that caries of the teeth is always external in its origin; that it is caused by the action of a decomposing agent, which exerts its influence slowly, and requires to be kept for some time in contact with the particular portion of a tooth which decays; that experience, dating long anterior to my own, and, in that respect, quite "antiquated," has established the fact that an artificial, permanent separation of teeth, closely in contact, will arrest superficial caries more effectually than the most perfect filling; that when it becomes apparent that decay will occur at the points where the teeth are in contact, it is the best practice to make the separation before the progress of the caries has rendered this method of treatment impossible, and that, as a general rule, if caries attacks the proximate surfaces of the incisor teeth of a child previously to the twelfth year, it is reasonably certain to attack the proximate surfaces of all the teeth except the inferior incisors before the twentieth year, and that the sooner the necessary separations are made the greater will be the advantage gained.

There is certainly no ambiguity about this; and I am so well convinced of the truth of these views that I am ready to meet any gentleman or gentlemen in the dental profession, in or out of this Association, or in or out of this city, at the regular meeting in December, and to discuss them in all their aspects.

I have said that I am interested in the matter so far only as it is one of public interest, and I would call the attention of the members present to the fact that the preservation of the teeth, especially the bicuspids, by filling, after the caries has progressed so far as to become apparent upon a mere visual examination, is very difficult. I think you will bear me out in the statement, that a great proportion of the ten thousand dentists (the estimated number now practicing) in this country do not possess the skill necessary to accomplish this object; and if they did, the great mass of the public would be unwilling, and a large part would be unable to pay such sums as would enable an operator to spend the time and nice care which are absolutely necessary to insure a good result. The same may, indeed, be said in many cases of cavities occurring on the proximate surfaces of the molar teeth. Vast numbers of operations in the way of filling at these positions, you will all bear me witness, are entirely worthless, either because the operator is incapable of performing them well, or cannot command sufficient compensation to enable him to employ the best material, and to devote the necessary time and care to their performance.

Another feature of the matter, too, and one which deserves the earnest attention of every humane man, is that, after the caries has penetrated the dentine so far as to render filling necessary, the operation becomes, in the great majority of cases, extremely painful, so much so, indeed, that many persons are entirely unable to endure the suffering occasioned by it.

I have strongly urged the advantages of the method of treatment proposed, on the grounds: 1st. That caries can be more certainly arrested by a thorough permanent separation than by filling. 2d. That the operation is simple and within reach of the ability of any practitioner who will do his work faithfully. 3d. That it is generally attended with but little pain. 4th. It is necessarily less expensive, and thus within the reach of many persons who would otherwise be compelled to permit their children to lose their teeth.

It must be admitted that the advantages claimed for this method are great. Do they exist? If I am correct in my views, an immense amount of unnecessary pain is daily inflicted and serious injury done. If I am wrong, it is certainly desirable that my errors should be exposed, and no one has a greater interest than myself in reaching correct views upon every point of importance relating to my profession.

WESTERN NEW YORK DENTAL ASSOCIATION.

At the late meeting of the Western New York Dental Association, the subject of the fitness of rose-pearl as a base for artificial dentures was referred to a committee, all of whom had taken out a license of Dr. McClelland for its manufacture. They submitted the following report, which I was by vote of the Society directed to foward for publication in the Dental Cosmos. Respectfully yours,

W. C. Barrett, *Secretary.*

Mr. President,—The committee to whom was referred the rose-pearl dentures, made by Dr. J. A. McClelland, of Louisville, Ky., beg leave to report as follows:

No. 1 is an entire upper denture, of which the wax model for the articulation of the teeth measured just seven-eighths of an inch from its upper edge to the apex of each of the eye teeth. On one side, the cuspidati and bicuspid teeth used had fangs reaching down to the model. On the other side, the same teeth, as well as all the intermediate ones, were teeth with short fangs, leaving some space between them and the metal model over which the plate was to be formed,—the cutting edges of those ten teeth, together with the molars in the wax, forming an even, regular line of articulation.

The denture, as now presented, shows the three teeth first mentioned (which have already been ground off one-sixteenth of an inch) to be fully one-sixteenth of an inch longer than the rest, making fully one-eighth of an inch which the rest of the teeth have shortened in the shrinking and shriveling of the material in drying.

This piece, when pronounced finished by Dr. McClelland, fitted the model over which it had been formed. At the present time, when placed upon the same model, a space is left in the roof, between the plate and the model, in some places of one-eighth of an inch.

This piece was admitted by Dr. McClelland to be a failure, and piece No. 2 was made as a substitute. In this all the teeth were furnished with long fangs, reaching down to the model, so that shortening of them in that direction should be impossible. In this piece, therefore, the shrinkage all had to be in another direction, and it was found necessary, after the piece had been once cured, to add about one-eighth of an inch in thickness to the whole exterior surface of the gum, after which the piece was again cured. Only one or two of the teeth changed position in drying, and, on the whole, after about four days' curing in all, it was pronounced a success.

There was but little adhesion, the doctor asserting that it would improve in this respect. It was worn three days, the adhesion growing less and less the whole time. The taste of ether remained, and the smell of that drug was perceptible by those coming into near proximity, until the piece could be worn no longer, on account of the gradual

but continued shrinkage. The piece has since lain in the drawer by its fellow, but has not yet attained the same degree of warpage. Now, when placed upon the model, it fits up to the roof into about the thickness of a silver dime.

Your committee do not desire to express any opinion in regard to rose-pearl, either for or against it. We only mention facts, leaving all to judge of its merits for themselves.

When we consider, however, that the composition, as placed in the mould, contains just one-half in bulk of exceedingly volatile matter, we cannot but admire the ingenuity which has so far controlled the shrinkage as to bring out anything approximating a dental fit.

That pieces may be made of this substance which can be worn, when all parts of the piece require to be very thin, your committee do not doubt; but they do not see how any dentist can afford to place any substance in the mouth of his patient, upon which to mount artificial teeth, which is liable, under any circumstances, to change shape in the mouth after leaving the hands of the dentist.

This was an unexpected feature, and it seems insurmountable. Dr. McClelland asserted in the most positive terms—and this assertion procured for him the majority of his class in this city—that the fit and adhesion were more perfect with the rose-pearl than with any other substance as a base. Your committee regret to say that his pledges on this head remain unredeemed. A piece was made for each member of this committee under the doctor's superintendence. Some were worn a few days; one may still be in the mouth of a patient; but in no instance was there a fit and adhesion obtained, which could not have been better secured with rubber or metal plates. This was unavoidable from the nature of the substance used. In shrinking over an irregular surface, every protruberance becomes a point from which the plate has tendency to draw into straight lines from one to another. This holds good in every part, from every small and from every large protuberance. Every ruga upon the surface, however nicely moulded, diminishes at least one-half, so that the plate can only rest upon their prominent points, without dipping into the depression between them, leaving a net-work of passages from which the air cannot be exhausted. From the larger points this takes place in greater ratio, so that under the most favorable circumstances the fit can only approximate, never attain, artistic perfection.

All of which is respectfully submitted.

GEO. E. HAYES, I. H. GIFFING,
R. G. SNOW, A. P. SOUTHWICK,
N. WHITCOMB, G. C. DABOLL,
Committee.

MINORITY REPORT.

I have examined the specimens of rose-pearl, and concur in the statement of facts in regard to them, but would like to see the material have a further trial before fully condemning its use. I intend to experiment with it, deeming that I have not given it a fair trial.

LEON F. HARVEY.

BUFFALO, Oct. 7th, 1868.

ERRATA.

AN error having occurred in the November number of the DENTAL COSMOS, in relation to the name and address of the Curator of the Odontographic Society, it is corrected as follows: S. S. NONES, D.D.S., 1106 Vine Street, Philadelphia.

PUBLISHER'S NOTICE.

THIS number of the DENTAL COSMOS completes the Tenth Volume. The first number of the Eleventh Volume will be issued January 1, 1869.

We send bills to those whose subscriptions have expired, with the request that such as contemplate renewing them will do so at an early date, in order that we may determine the number of copies to print, and that those who desire may be certain of securing complete files of the journal.

BIBLIOGRAPHICAL.

A PRACTICAL TREATISE ON MECHANICAL DENTISTRY. By JOSEPH RICHARDSON, D.D.S., M.D., formerly Professor of Mechanical Dentistry and Metallurgy in the Ohio College of Dental Surgery. Second edition, very much enlarged, with one hundred and fifty-nine illustrations. Philadelphia: Lindsay & Blakiston. 1869. Received from the Publishers.

When the first edition of this treatise made its appearance a few years since, a favorable notice of the contents was presented in the DENTAL COSMOS. On the present occasion, therefore, it is only necessary to add, that in the second edition, now offered to the profession, all the improvements and additions made in this department of dentistry within the past ten years have been embodied in the work, making numerous interpolations in some portions necessary, while other parts have been entirely rewritten. In the preface the author acknowledges his obligations to Dr. John Allen, Jr., for a concise and accurate description of his method of constructing artificial dentures with continuous gums; also to Prof. N. W. Kingsley, for a comprehensive

account of his improvement in artificial vela and palates. The working of aluminium as a base for artificial teeth receives due attention. Those who have the first edition will find this a valuable addition to their libraries, while to the young student and practitioner, devoted to this department, it will prove an indispensable work.

J. H. McQ.

Outlines of Comparative Anatomy and Medical Zoology. By Harrison Allen, M.D., Professor of Zoology and Comparative Anatomy in the University of Pennsylvania. Philadelphia. 1869. J. B. Lippincott & Co.

In the study of human anatomy and physiology, the conviction is forced upon the minds of those who look at the matter philosophically, that it is impossible for students to form accurate views of the structure and functions of the various organs of man, unless comparisons are instituted between them and the organs of lower animals,—passing, for instance, from the simplest to the most complex form of any particular organ, by viewing its modifications, as presented in insects, fishes, reptiles, birds, and mammals. Such comparisons naturally induce a desire on the part of some for a more extended knowledge of comparative anatomy than can be afforded under these circumstances. This department of science, however, is so vast and illimitable, and the works treating upon it, as a general thing, are so voluminous and expensive, that few have the time or means to enter systematically upon its study. The work whose title appears at the head of this notice is well calculated, however, to meet such contingences, prepared, as it has been, with the view of presenting, in as limited a space as possible, a comprehensive description of the leading points in comparative anatomy and zoology. The author having devoted years to the careful study of the subject-matter of the treatise, under the most favorable auspices, embracing free access to the libraries and museums of the Academy of Natural Sciences of Philadelphia, the Medical Department of the University of Pennsylvania, and the Smithsonian Institute, Washington, the result of his labors is in every respect highly creditable to him, and calculated to prove of valuable service not only to those just entering upon the study of comparative anatomy, but also as a work of ready reference, in refreshing the mind on leading features of this department, to those conversant with the subject. The definitions presented are terse and exact, and the classification of the anatomical systems is in accordance with the present state of the science, while the descriptions are clear, and, as the title of the work indicates, eminently concise. The mechanical execution of the work is in keeping with the well-known character of the establishment from which it emanates.

J. H. McQ.

Correlation of the Physical and Vital Forces. An Inaugural Address, Introductory to the Course of Institutes of Medicine in the Jefferson Medical College, delivered October 12th, 1868, by J. Aitken Meigs, M.D., Professor of the Institutes of Medicine and Medical Jurisprudence, one of the Physicians to the Pennsylvania Hospital, etc. Published by the Class. Philadelphia. 1868.

A copy of this able address has been received from the author. In its delivery before a large and deeply interested class of students and prominent men of science in our city, the high expectations of the friends of Prof. Meigs were fully realized, presenting, as he did, in eloquent and forcible language, the present advanced views on this important subject. It is a matter of regret that limited space only permits the publication of the following extract, which, however, embodies the key-note of his address. After an appropriate reference to the medical, scientific, and literary reputation of his eminent predecessor, Prof. Dunglison, he said:

"And now as I question myself how I can best occupy this hour, the words with which Hippocrates opens his Aphorisms, fall admonishingly upon my ear. 'Life is short,' said the sage of Cos, 'the art long, the occasion fleeting.' Constrained by these solemn and warning words of the Father of Medicine to turn aside from the trite congratulations and rhetorical display to which custom has somewhat unwisely devoted the introductory hour, I simply assure you of the sincere pleasure with which I greet your presence here to-night, and proceed, at once, to throw widely open the gate of entrance into the rich and varied domain of Physiology. Anxious to leave in your minds some substantial memento of the time and place,—a memento which shall outlive, if possible, the 'fleeting occasion,'—I propose to discourse to you, without further preliminary, upon certain historical points connected with the great doctrine of the Correlation of the Physical and Vital Forces, at present so strongly attracting the attention of the scientific world, and by so doing, to redeem a promise made to one who now slumbers in his lonely grave by the moaning sea, and who, during the latter years of his life, was to me both friend and teacher.

"It was in the grim midwinter, fourteen years ago. All day long, with never a pause, the snow had fallen rapidly, and the dreary midnight found me trudging laboriously homeward from the couch of a dying friend and patient. Long and anxiously had I striven, but in vain, to rescue the sufferer from his doom. As I toiled on amidst the deep-lying snow, with muffled body bent against the chilling blast, I asked myself again and again the question, Why is this man dying? What is the secret of this mystery called death? In rapid succession all the scholastic definitions of life and death flitted through my mind, but upon none of them could I rest with satisfaction.

"Thus mentally occupied, I found myself in front of the residence of one whose conversation had for me at all times a deep and abiding attraction. Knowing how late into the night his studies were habitually prolonged, I rang without hesitation and was promptly admitted. I found him alone, this 'immortal heretic' in science, as that eminent

physiologist, Dr. B. W. Richardson, of London, has recently styled him. On the table, on the chairs, in every available spot, books and manuscript were profusely scattered, while over all, the blazing fire in the grate cast a genial glow. The cold without, the books, the cheerful fire, and the quiet within, strongly invited to study and contemplation. I detailed to him the symptoms of my patient, and sought his aid in interpreting this riddle of death. Earnestly we conversed together long past the 'dead waist and middle of the night.' 'So long,' said he, in the course of this conversation, 'so long as the present doctrine of a vital force peculiar and unlike any other force in nature, prevails, so long will this riddle remain unsolved, so long will we stand in the presence of this Sphinx, confounded and amazed, so long will the phenomena of life, disease and death remain for the physiologist, the pathologist, and physician, a series of facts without co-ordination and without harmony.' Upon this topic he dwelt with glowing language, and though he complained of the neglect which his labors had experienced, he expressed his confident belief that the time would come when his opinions would find powerful advocates among the scientific men of the future. So I left him in the leaden-gray dawn of the winter morning, with the promise that, should a fitting opportunity ever offer itself, I would endeavor to give to his views their due place upon the historical record. Singularly enough, this opportunity occurs at the very time that the illustrious British physiologist just referred to is advocating these views with his powerful pen, and illustrating them by means of well-devised experiments."

The views advanced in this admirable address on the "Correlation of Forces," are in accordance with those presented by the writer of this notice, at the meeting of the *American Dental Association* at Chicago in 1865.

SELECTIONS.

THE DENTISTS AND THE HARD RUBBER CONTROVERSY.

HENRY B. GOODYEAR, Administrator, et al., *vs.* T. S. RUST. U. S. Circuit Court, District of Connecticut. Nov. 1868.

OPINION.—SHIPMAN, J.

"THIS is a motion for a preliminary injunction founded upon the well-known Nelson Goodyear patent for vulcanizing rubber and other similar gums. The validity of this patent has been so often sustained by adjudications, that no question will be considered in deciding the present motion except that of infringement. The bill of complaint in this case is supported by affidavits, which clearly entitle the complainants to the injunction prayed for, unless the respondent's proofs overcome or avoid their effect. The respondent works under the patent of Edward L. Simpson, and uses the compound made in accordance with the process described in that patent. The complainants allege that this process is clearly within the scope of Goodyear's invention as described in his

patent, and is therefore an infringement of their rights. This is denied by the respondent, and the question, so far as it is necessary for the determination of this motion, is now to be decided.

"Avoiding all useless rehearsal of the details of the Goodyear patent, and of the repeated litigations to which that patent has been subjected, it may be briefly stated that the process covered by it is secured by mixing about four ounces of sulphur and one pound of rubber, and subjecting this mixture to not less than 260° to 275° of heat, Fahrenheit scale. This, under proper conditions of place and time, produces the compound or substance known as vulcanite, a material now well known in the mechanic arts. The vital question involved in the present controversy relates to the proportion of sulphur and rubber, and the degree of heat. Does the Simpson process substantially embrace these proportions and this degree of heat? If it does, then it is an infringement of the complainants' rights.

"The respondent denies that the Simpson process does embrace all these proportions as effective agents or active forces in accomplishing the work of vulcanization. In support of this denial he has adduced affidavits of distinguished chemists, who give a delineation of the elements which enter into Simpson's mixture and produce his vulcanite. It will be sufficient in this place to refer to the affidavit of Professor Seely, as that contains all the materials of the defense to this motion.

"Professor Seely says that the substances used by Simpson in the preparation of his hard rubber are sulphur, gum benzoin, oil, and common rubber; and his manner of using these substances, as set forth in his patent, is as follows: he mixes two ounces of benzoin with sixteen ounces of sulphur, and to sixteen ounces of this mixture he adds one quart of linseed oil. This mixture of sulphur, benzoin, and oil is then subjected to the proper degree of heat, and the result is the substance which he calls his vulcanizing compound. To make hard rubber, or vulcanite, he takes from ten to fourteen ounces of this compound and one pound of rubber, and thoroughly mixes them by grinding between warm rolls. He then subjects this mixture of rubber and vulcanizing compound to a heat of 320° Fahrenheit. The result is a vulcanite.

"Without rehearsing the details of the analysis presented by Professor Seely, it may be stated that the quantity of this compound which is necessary to perfectly vulcanize one pound of rubber, contains, in some form, not much less (to use the language of Goodyear's specification) than four ounces of sulphur. In other words, this amount of sulphur goes into this quantity of the compound and forms one of its original elements. About half of this sulphur chemically combines with the oil and forms what Professor Seely calls vulcanized oil, and the other half exists in the mass of vulcanized oil in the form of free sulphur. Vulcanized oil alone, when mixed with rubber, will not vulcanize the latter, according to the evidence before me. Professor Seely says: 'The effect of vulcanized oil on mixing and heating with rubber is not at all chemical. The rubber does not in any chemical sense become vulcanized. Whatever advantage there be in the use of vulcanized oil with rubber must be wholly due to physical and molecular causes, and cannot be accounted for on any theory of vulcanization based on Goodyear's processes. A quantity of vulcanized oil, containing four, or even sixteen ounces of sulphur, may be mixed and heated with one pound of rubber, and not an atom of Goodyear's hard rubber can be produced.'

"He then goes on to say: 'Simpson's compound is composed of vulcanized oil and free sulphur. When the compound is rolled and heated with rubber, the free sulphur no doubt acts upon the rubber with its full efficiency; and in estimating the vulcanizing or hardening properties of the compound, the value of the free sulphur, if any, must be conceded. It is therefore necessary to compute the amount of free sulphur in Simpson's compound.'

"This computation he then proceeds to make, and the result is as I have stated, that one-half of the sulphur is combined with the oil (chemically) and the other half remains free; or, as Professor Silliman expresses it, is 'entangled in the mass of this compound.' Professor Seely says of this compound: 'The free or effective sulphur is exactly one-half of the whole content of sulphur.'

"What part the benzoin plays in the compound does not appear from the evidence. But I gather from Simpson's specification that 'its vaporizing qualities more perfectly expel the fumes of the sulphur as well as the odor from the oil, and render the compound nearly, if not perfectly, odorless.' In the performance of this office it may be an improvement on Goodyear's process.

"It is conceded, then, that vulcanized oil (oil and sulphur chemically combined) will not produce, when mixed with rubber and heated, vulcanite. There is no proof that the benzoin renders the vulcanized oil any more effective as a vulcanizing agent. It is equally conceded by the respondent's evidence that the quantity of free sulphur in Simpson's compound cannot alone vulcanize. It is asserted that the vulcanized oil, and the free sulphur scattered through it, does successfully vulcanize, whenever the mass of compound applied to one pound of rubber contains in the whole not much less than four ounces of sulphur in all, free and combined. Such a proportion of the mass to the pound of rubber is necessary to comply with the conditions of Simpson's patent.

"We have, then, Goodyear's invention, which consists in combining not much less than four ounces of sulphur with one pound of rubber, and submitting the same to not much less than from 260° to 275° of heat, Fahrenheit scale.

"We have Simpson's process, which consists of combining not much less than four ounces of sulphur with one pound of rubber, and subjecting the same to a heat of 320°, Fahrenheit scale.

"The distinction which is sought to be made between these two compositions or processes is founded upon the claim that in Simpson's one-half of the sulphur is first chemically combined with oil, forming a new substance termed vulcanized oil, which there, though acting in the same mass with the remaining half of the sulphur as an auxiliary vulcanizing agent, acts in a different way from the free sulphur itself. In other words, half the quantity of sulphur necessary to vulcanize under Goodyear's process has disappeared and exists no longer, except as it is represented in a new chemical substance called vulcanized oil. The other half remains. But neither the half that remains nor any quantity of the new agent can alone vulcanize. Yet the two, acting together, at once perform this important office, and produce the same result as Goodyear's combination.

"I have said that it appears from the evidence that the *chemically combined* elements of the compound of Simpson alone will not produce, when mixed and heated with rubber, vulcanite. I infer this from the

language already cited from Professor Seely's affidavit, where he says: 'A quantity of vulcanized oil, containing four, or even sixteen ounces of sulphur, may be mixed and heated with one pound of rubber, and not an atom of Goodyear's hard rubber can be produced. Simpson's compound is composed of vulcanized oil and free sulphur.' I have not failed to notice that the language is that the vulcanized oil in combination with the rubber will not produce 'an atom of *Goodyear's* hard rubber.' But as the whole scope and direction of the defense are aimed at establishing a distinction between the *processes* and not between the *products*, I can come to no other conclusion than that the compound alone, if destitute of free sulphur, would not, when mixed with rubber, perform the office of vulcanization. It is true that the compound, when made according to the patent of Simpson, always contains one-half of the sulphur in a free state; but it is agreed on all hands that this amount of free sulphur alone will not vulcanize. So the evidence in whatever light we view it, proves that that portion of the compound which contains the elements in chemical combination is powerless without the aid of the uncombined free sulphur, which is scattered through the pores of the combined mass.

"Now it may be asked, how do these two agents, viz., vulcanized oil and free sulphur, by their united forces, perform the work of vulcanization? No part of this work is assigned by the evidence to the benzoin. It cannot be done by the chemically combined oil and sulphur alone. It cannot be done by the free sulphur alone. The latter, to the extent of its effective power, for all that appears in this case, works in the same way that it does in Goodyear's process. The effect of the former (oil and sulphur chemically combined), Professor Seely says, is not chemical, but 'must be due wholly to physical and molecular causes.' But whether the auxiliary vulcanizing force, whatever it is, exerted by the chemically combined oil and sulphur, is supplied by the latter or not, does not appear by the proof. From what has long been known, however, of the vulcanizing power of sulphur, when mixed and heated with rubber, that agent, though combined with another substance, would naturally be looked to as the seat of this force.

"It may be true that, as Professor Seely says, the effect of vulcanized oil in hardening rubber, is due not to chemical, but 'to physical and molecular causes.' Of the nature or significance of this distinction in the scientific sense I do not presume to speak. But I do not see how this fact avoids Goodyear's patent. I do not find in his specification any evidence that he rested his invention upon any such nice scientific distinction, or that he limited his claim to sulphur when working through chemical, as distinguished from 'physical or molecular' laws. If the validity of his patent rests upon such a scientific problem as this, I think its solution should, in the present case, be left to final hearing. The suggestion of such a problem, in *ex parte* affidavits, at a very late stage of a series of protracted litigations, in which every other defense has thus far failed, is not a valid answer to this motion.

"There can be no question but Simpson uses a degree of heat within the scope of Goodyear's patent.

"Let an injunction issue.

"For the complainants, C. T. Blake, and Hubbard and Hyde. For the respondent, S. D. Law and H. T. Blake."—*Hartford* (*Conn.*) *Post.*

PERISCOPE OF MEDICAL AND GENERAL SCIENCE IN THEIR RELATIONS TO DENTISTRY.

BY GEO. J. ZIEGLER, M.D.

Food and Work.—In an instructive lecture on the influence of "Customs, Habits, and Morals on Health" (*Med. Times and Gaz.*), Dr. R. Druitt makes the following pertinent remarks on this subject: "Regarding food and drink, there is much which the sanitary teacher finds to say. The physician at the west end of London sees the results of overfeeding—of the three solid meals of animal food, and the copious libations of heavy beer, in which servants indulge; but he is equally aware of the impoverishing effect of a diet nominally wholesome, but virtually destitute of all stimulating properties, such as is given to children in many families, to apprentices, working girls, and inmates of institutions. My friend Mr. Hunt pointed out long ago the necessity of variety, and showed that, by instinct as it were, the London poor mitigate their habitual diet of bread, tea, and gin, with shell-fish and water-cresses. I was assured by a gentleman educated at a very high-priced school, where particular attention was paid to the boys' health, and where the diet was abundant and excellent, but uniform, and excluded all 'unwholesome substances,' so called, that the boys in their walks, driven by a kind of instinct, used to eat any weed or herb they came across that was eatable—the young shoots of the white thorn, the field sorrel, and young grass in particular. But a knowledge is yet anything but general of the mutual relations of brain work and stomach work, or I should rather say of brain work and the whole nutritive system. Where the brain is quiet, the stomach tolerates any food, and any process of growth and reparation goes on vigorously. Where the brain is overworked, the limited fund of what we may call *vital* force, or of arterial blood, being expended in the brain, leaves the feet cold, and the stomach languid. The corollary is that where much brain work is demanded from growing children, the clothing must be extra warm, the food extra nourishing, digestible, and abundant; otherwise the result will be cleverness without force, big foreheads, crooked legs, pale skins, decayed teeth, great impressionability and nervousness, tendency to intemperance, immorality, phthisis, and madness.

"Now I must touch on a subject which the sanitary teacher may well comment on, not in its religious, but in its moral, social, and political aspects, and that is *fasting.* Among a population with the propensities of the Anglo-Saxon two things are morally certain. One is, the absolute necessity for some discipline which shall inculcate self-denial, self-restraint, and provision for future time (which can only consist in abstinence at time present). The other, that he will reject such discipline. We hear of workmen in the Black Country earning large wages and spending upon luxurious dinners of lamb and peas sums which would keep an agricultural family in the south, and absolutely leaving their families to the mercies of the poor-law when a season of distress comes upon them; and we see the mechanics and journeymen in London, earning large wages, wasting at least one day a week in junketing, and putting by not a farthing. We may well express our

belief that a discipline involving some periodical restriction either in the quantity or choice of food, would be productive of the best moral effects. Certainly the moral effect would be prodigious if workingmen in good health could be trained to go without beer one day in the week. Intemperance is one of our greatest curses; but where is temperance taught? But with an Anglo-Saxon population, the greater the need for such teaching the less likely are they to submit to it. They glory in eating and drinking as national virtues, and would soon find out moral and religious grounds for not fasting, for most assuredly a popular religion must be the reflex of the popular vices as well as its virtues. As for technical fasting, that is, satisfying the appetite with sufficient quantity, but excluding food of certain quality, such as flesh meat, it promotes a most interesting branch of cookery in the preparation of *meagre* dishes made savory by vegetables; and it would be a national boon if this mode of cookery were encouraged. Abstinence from fermented liquors alone would be most effective and desirable. But when fasting consists in the denial to a not overfed body of the *quantities* necessary for work and nutrition, it must, I think, be condemned without hesitation as unfit for this climate, and for persons who must work and not merely indulge in contemplation. I know many excellent religious persons whose forenoons at certain seasons are passed in the greatest discomfort, and I believe that the result is bad for health and temper; while all the good of a discipline in self-denial may be obtained with benefit to both."

Saving Tissues.—Dr. JEWETT thus forcibly answers in the *Amer. Phrenological Jour.* the question: "Is it true, as asserted by some of our medical men and advocates of moderate drinking, that the presence of alcohol in the human body prevents the waste of tissues?"

"'Prevents the waste of tissues!' It does, to a certain extent. It stupefies the fellow so that he cannot use his muscles or brain. Where-ever you develop power, you waste tissue; if you develop thought, you waste brain. When a fellow is dead drunk, he saves his tissues. Toads have lived in rocks one hundred years; but who wants to live a toad's life for the sake of saving his tissues? I don't want to save my tissues. I want to go to my table every day, and have it well spread with substantial food, and incorporate the vegetable compounds and make them a part of Jewett; and then I want to use up the energy in advancing the glory of God and promoting the good of mankind."

Work and Waste of the Human Organism.—"Dr. BYASSON has just published a prize thesis on the Connection that exists between Brain-work and the Composition of the Urine, which serves to a certain degree to supplement the investigations of Dr. Haughton. In order to compare the urinary secretion during the period of active brain-work with the urine in other conditions, he has analysed the twenty-four hours' urine under the five following conditions:—(1) During a 'mixed animal' diet, (2) during a uniform diet without animal food, (3) during repose, (4) during cerebral activity, and (5) during muscular activity. As a matter of convenience for the sake of reference, we will here insert a table,* which shows at a glance the mean results obtained in his different sets of experiments, each of which was continued for several days.

* Omitted.—Z.

"The first and most striking point exhibited by his results is the extraordinary change which is, as it were, instantaneously impressed upon the urine by an alteration of the diet. As soon as the diet, in place of being mixed (although chiefly animal), is made almost purely vegetable, the amount of urea at once falls by twelve grammes, or about one-third, in twenty-four hours. This observation affords an important confirmation of the similar results previously obtained by Lehmann and other chemists. The principal observation made during his course of experiments on himself had refererence to the quantity of the daily urine, its density, its acidity, and the proportions of urea, uric acid, phosphoric acid, sulphuric acid, and chlorine.

"The minimum quantity of urine occurred on the days of muscular work, the diminution being due to the greater exhalation from the lungs and the increased amount of sweat, and additionally, but in a less degree, to the absorption of the urine while in the bladder. In reference to this last cause our author observes:

"'Suppose that the desire to micturate is felt very powerfully and is resisted for a few moments, and that powerful muscular action is then exerted, the desire is found to have disappeared for some hours. The result is too marked to be referred to the absorption of water by endosmosis through the walls of the bladder, and the return by this means of the water into the venous circulation.'

"A relatively maximum quantity of daily urine was secreted on the days when cerebral action was at work.

"A comparison of the figures in the columns headed *acidity* and *uric acid* readily shows (if proof were needed) that the latter is not the only free acid in the urine, hippuric and carbonic acids concurring to give an acid reaction to the urine. The generally accepted view (originally proposed by Liebig) that the acidity is mainly due to the transformation of the alkaline into acid phosphates by the action of uric acid is rejected by Dr. Byasson, for reasons which we think it needless to quote until we have repeated his experiments. We will here merely state that, for certain given reasons, he concludes that the uric acid exists in the urine partly in a free state and partly conjugated or combined with alkaline phosphates.

"A reference to the table shows that, contrary to the results obtained by Lehmann, diet exerts a marked effect on the daily excretion of uric acid. The state of the brain (whether at work or in repose) has no effect on the excretion of this ingredient, which, on the other hand, is much increased on the days devoted to muscular work.

"In his subsequent remarks upon *urea* he discusses the question as to whether it arises solely from the disintegration of the tissues or whether it is also formed in the blood. He adopts the latter view, and holds that urea is formed in the blood, especially when albuminoid matters are conveyed to that fluid in excess, and to the urea thus formed he gives the name of *urea of calorification.*

"In tracing the variation in the daily excretion of urea, we see that the smallest quantity corresponds with the days of repose, while nearly three grammes more occur on the days of muscular activity, and nearly four grammes (or about a drachm) more on the days devoted to brain-work. In some experiments Dr. Byasson found that the difference nearly reached five grammes, and he observes that if a state of perfect repose could be attained the difference would doubtless be even greater.

The experiments were so arranged that a day devoted to brain-work sometimes succeeded a day of repose, and sometimes a day of muscular work, and in each case there was a perfect concordance in the results.

"The urea that is excreted by a person taking a due supply of mixed diet arises from two distinct sources, the greater part arising from the disintegration of the animal tissues, and varying in amount with the rapidity of their destruction and reparation, while the latter is the urea of calorification already described. The former is of by far the greater importance, and may be regarded as essential to life, for when its amount falls below a certain limit all the vital movements cease, and death is the necessary consequence. The latter is of relatively little importance, and, if the food is rich in starchy and fatty foods, and contains little nitrogen, is formed in very small quantity. In childhood, for example, when growth is rapidly going on, very little urea of calorification is formed. The urea of disintegration is mainly due to (1) the accomplishment of the respiratory, digestive, and circulating functions, (2) the accomplishment of voluntary muscular activity, and (3) the accomplishment of cerebral activity. Hence, including urea of calorification, we have no less than four distinct sources to which we must refer the urea put down in the above table under a single heading; and the question arises as to how we are to decide the mean quantity of urea (34·47 grammes) excreted during a mixed animal diet. This question can never be rigorously answered, but careful experiments and observations may yield approximate answers.

"The most important variations of the urinary constituents, next to those occurring in urea and uric acid, are those presented by phosphoric acid, sulphuric acid, and chlorine; and from the table it appears that cerebral activity occasions a considerable relative increase of both the acids, while muscular activity augments the excretion of chlorine. The fact that the urine in repose contains a larger quantity of chloride of sodium than during muscular exercise is at first sight surprising, but it may be accounted for by recollecting that the secretion of sweat, which is especially rich in this salt, is comparatively suspended during bodily rest, and that consequently the chloride of sodium finds a fresh channel for its excretion. On the other hand, the phosphates and sulphates are in such small quantities in the sweat that the differences in amount which these salts present during the respective periods of cerebral activity and muscular work cannot be referred to this source.

"The following are the principal conclusions which Dr. Byasson draws from his experiments:

"'The exercise of cerebral activity properly so called, or of thought, is accompanied by the attendant production and simultaneous appearances of urea and of the phosphates and sulphates of the alkalies in the urine.

"'The exercise of muscular exertion is accompanied by the abundant production and simultaneous appearance of urea, uric acid, and chloride of sodium in the urine.

"'If the separate urines of a man who for three days has adopted a uniform diet, and has submitted himself to the same external conditions, are presented to a chemist, he can tell by a single analysis which was passed during repose or cerebral or muscular work.'"—(*Med. Times and Gaz.*)

Chemistry of Life.—In a recent introductory, Prof. HENRY DRAPER observes (*The Med. Gazette*): "I shall have during the course to show you the bearing of chemistry on our race, and to prove that man himself, from one point of view, bears a most essential resemblance to other machines for evolving power. Apparently a permanent organism, he is in a state of perpetual change; no part of him is free from continued wasting away, and as continued replacement. His aspect of material identity is all a delusion, for in no two consecutive moments is he the same. The body he had a moment ago is not the body he has now, and long before the commonly supposed seven years are out, he is, with trifling exceptions, over and over again, renewed. In a single year enough material enters the body to build it up a score of times, and the life of an old man, therefore, represents the form that more than one hundred tons of matter have assumed. His actions have been the transmutations of the light and heat derived from the sun by that matter when it became a part of plants. Man is an ever-changing mass of substance, consuming away and turning into smoke and ashes, and according to the very laws that hold for a piece of wood or lump of coal, under similar circumstances. The graceful figure, gentlemen, you may have clasped in your arms, the form of the fair one to whom you may have sworn eternal fealty and affection, is as fleeting as the kiss you have pressed on her lips. You are forsworn in the moment of taking your oath—you have grasped but a shadow, as transitory as the flame of a candle."

"*Physiology*," says the same author (*Ibid.*), "will bring before you the minute structure of parts and the function of the various organs. It will show you how a morsel of food taken into the mouth is on the eve of passing into a beautiful laboratory, which the delicate operations of a chemist may mimic, but not equal, in its exquisite actions. Ground, as in a mortar, by the teeth; acted on by potent acids and alkalies in the digestive system; filtered through fine-pored membranes, and suffering in its purified state further chemical changes, it becomes eventually a part of the body; but only, so to speak, for a moment, for having reached the highest point it is to attain, it cannot remain still, but starts in a retrograde metamorphosis, yielding up the power it held, till it returns to the simple binary form of water, carbonic acid, or ammonia, once more, rejected from the system, under the eye of the sun to be reconstructed through a plant form into fit food for man.

"It will show you how the body, like a fire, has its inward coming draughts of air and its outward going rush of burnt products, whether as gases, liquids, vapors, or solids, and how in the glow of fever or in the icy cold of cholera, the similitude is still kept up, just as the smith gains a more fervid heat by forcing more air upon his coal, or damping the fire, causes it, almost extinguished, to smoulder away unseen.

"It will point out to you beautiful mechanisms, taking advantage of every needful physical principle to keep up a perpetual intercommunication throughout the body, a system of ramifying canals to carry the destroying oxygen and the repairing nourishment to every part, and to remove away the wasted products of decay. We may boast of our railroad and canal and river and road communication through the body politic of this United States—that every city and town and village is chained to the great centres—that our telegraph can speed a thought

with infinite rapidity throughout the whole—yet where does that completeness stand when we reflect that the foot of a fly cannot touch the skin without the knowledge of the sentient brain, and that the minutest needle prick will penetrate with certainty our system of blood-vessels! The eye, the ear, touch, taste, and smell, each in its turn, will instruct and elevate our minds, and lead us to graver reflections on the relation of man to man, and to the aggregate of human particles we call society."

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"*Oxygen Mixture, a New Anæsthetic Combination.* By E. ANDREWS, M.D., Professor of Principles and Practice of Surgery, Chicago Medical College.—Every surgeon who has seen the prompt and pleasant anæsthetic action of the nitrous oxide gas, so much used by dentists, has wished that in some way it might be made available in general surgery. The patient usually goes under the influence in 30 or 40 seconds, and wakes with equal promptness, without vomiting or other unpleasant symptoms, all of which is in striking contrast with the slowness, the nausea, and the discomforts of chloroform and ether. There have been, however, great obstacles to the use of the gas, owing to its evanescent action. The oxygen contained in it is in a state of chemical combination, so that it is not available for oxygenation of the blood;* hence, if any attempt is made to continue its action, the patient becomes purple in the face, showing all the signs of asphyxia; subsultus tendinum then supervenes, and shortly after he almost ceases to breathe, and, if allowed nothing but pure nitrous oxide, would doubtless die in a few minutes.

"I have for some time been experimenting, to see whether by the addition of free oxygen to the nitrous oxide, a mixture would not be obtained, by which a patient might be anæsthetized for an indefinite period without danger of asphyxia, and thus render the gas available for the most prolonged operations of surgery. These experiments are not yet finished, but they have advanced far enough to show that the preparation, which I have named the Oxygen Mixture, is certainly available for a large part of our operations, and that for pleasantness, and probable safety, it is infinitely superior to chloroform, ether, or unmixed nitrous oxide. The following facts and experiments show the present state of our knowledge on the subject:

"In the first place, pure nitrous oxide, when given for brief operations, appears to be the safest anæsthetic known. Chloroform, in American and European hospitals, kills one out of about every 3600 patients who take it; but the Colton Dental Association, a company with branches in all our principal cities, established for the sole purpose of extracting teeth, has on its books over 60,000 cases of anæsthesia by nitrous oxide, without a single death caused by the anæsthetic.

"Now, it cannot be supposed that the addition of a moderate amount of free oxygen, in mechanical mixture, to nitrous oxide can produce any new danger; on the contrary, by removing all possibility of asphyxia, it must be eminently an element of safety.

"To test this question, the following experiments were performed:

"*Exp.* 1.—A large rat was placed in a glass jar on a perforated floor, beneath which was a stratum of lime-water to absorb the carbonic acid

* This is contrary to my own experience, which is decidedly in favor of its imparting oxygen to the system.—Z.

produced by its breathing. To make more sure of this result, a jet of lime-water spray was thrown into the jar at frequent intervals during the experiment. I then turned on a small stream of pure nitrous oxide gas, which, being fifty per cent. heavier than atmospheric air, settled to the bottom, and expelled the atmospheric air by displacement. In two minutes the animal fell over upon its side, breathing slowly with deep-labored inspirations. The respirations continued to become slower, until, at the end of ten minutes, they ceased entirely, and life was found to be extinct. The death was doubtless from asphyxia.

"*Exp.* 2.—Another rat was placed in the jar under the same conditions, and exposed to an oxygen mixture consisting of about one-fourth of free oxygen to three-fourths of nitrous oxide. In two and a half minutes he was so completely anæsthetized that he could not be made to respond to pinching or pushing. There was no panting, or laboring for breath, as when pure nitrous oxide was used, but the respiration was rather slow, and very gentle. He was kept in the mixture half an hour, and then removed, still perfectly anæsthetized. In five minutes he began efforts at walking, and in ten seemed to be perfectly restored to his natural condition.

"*Exp.* 3.—A rat was placed in the jar and given the oxygen mixture, containing 25 per cent. pure oxygen. This being more than is contained in the atmosphere, diluted the nitrous oxide too much, which, together with the fact that the animal was less susceptible than the former, prevented full anæsthesia. He fell into a sort of intoxicated condition, without appearing to be fully unconscious, and continued thus throughout the experiment. At the end of thirty minutes the gas was shut off, and the animal shortly recovered his sobriety.

"*Exp.* 4.—The same animal was again exposed to the oxygen mixture for half an hour, with precisely the same results as before.

"*Exp.* 5.—To test the relative safety of the oxygen mixture as compared with ether, my friend Dr. Sherman took the same rat, after his recovery from experiment No. 4, and dropped into the jar a little sulphuric ether. In a short time he was unconscious, and in two minutes was dead.

"*Exp.* 6.—A lady had an anchylosed knee, to which I wished to restore motion by forcible flexion. Having a dread of ether and chloroform, she inhaled the oxygen mixture in the proportion of one-third free oxygen to two-thirds nitrous oxide. In forty seconds she was perfectly anæsthetized, without any blueness of the countenance, or laboring for breath. There was a little pallor about the lips. I broke up the adhesions of the joint by flexing and extending it forcibly. She probably inhaled the gas about two minutes, felt no pain, and awaked without nausea.

"*Exp.* 7.—A young woman took in my presence the mixture as prepared by Dr. Rogers, dentist, for the extraction of a tooth. There was, as before, a slight pallor of the prolabia, but no asphyxiated purpling of the face. The tooth was extracted without pain, and the patient awoke without nausea.

"*Exp.* 8.—A woman, aged 42, had anchylosis of the right hip, with contraction of the flexors of both knees, fixing those joints at a right angle. I desired to cut all the hamstring tendons of both limbs, and to break up by force the adhesions of the anchylosed hip. The gas was given from a 30-gallon elastic bag, with an imperfect inhaler. The

mixture contained one-third free oxygen. Owing to the imperfection of the inhaler, it was found impossible to prevent the patient getting considerable atmospheric air with the gas, so that the anæsthesia was less perfect and slower than in the former instance. After inhaling it for nine minutes, she became unconscious, and I severed all the hamstrings. I then endeavored to break the adhesions of the head of the femur, but found they were too firm, and I desisted. The operations lasted about three minutes, when she was allowed to recover, which she did without nausea, though she had a meal in the stomach. Twice during the inhalation there was a sort of pallor of the face, with very faint duskiness, which induced me to suspend the administration of the gas a few respirations.

"*Exp.* 9.—Mrs. R. had ingrowing, painful nails on both feet. Ten months ago she took ether for the extraction of one of them. She was of a very nervous temperament, was slow in coming under the influence of the ether, and after partially awaking remained delirious, and distressed a considerable time. Three months afterward she took pure nitrous oxide for the extraction of a tooth. She was anæsthetized in about one minute, and felt no pain, but the countenance was blue with asphyxia, and she was delirious a good while after waking. She felt uncomfortable for several days. Six months afterward she was again anæsthetized by Dr. Reber, a dentist, who had prepared the oxygen mixture at the suggestion of Dr. Sherman. The gas contained one-third free oxygen. She was anæsthetized in one and three-quarter minutes, and in that condition Dr. Sherman split the offending toe-nail and tore out the proper half of it without causing any pain. She inhaled the gas for three minutes in all. On awaking, she was as usual delirious, which state, however, continued only fifteen minutes, a much shorter time than after ether or pure nitrous oxide. There was no blueness nor pallor of the lips during inhalation, and on her waking she was much more comfortable than after anæsthesia with the other articles.

"Dr. Reber has given the oxygen mixture to several patients for the extraction of teeth, and states that it uniformly acts more agreeably than unmixed nitrous oxide.

"Dr. Rogers, a dentist of this city, states that he has used a mixture containing one-third free oxygen for several years, and that in his opinion it is far pleasanter than unmixed nitrous oxide.

"Some months ago some such mixture was proposed in England, but was overthrown, I think, by the influence of Dr. Richardson, who argued, on theoretical grounds merely, that it would not be successful, nor safe. I cannot learn that it was ever actually tried in Europe.

"Prof. Watt, of the Dental College in Cincinnati, has been experimenting, I understand, on what involves partly the same principle. I am informed that he gives alternately inspirations of nitrous oxide and atmospheric air, and thus both avoids the asphyxia, and is able to continue the inhalation a long time. I have written to him inquiring about his results, but have received no answer.

"The above experiments are by no means sufficient to settle the value of the oxygen mixture, but they give strong reason to think that it will prove the safest, and by far the pleasantest, anæsthetic known. As to its safety, it is highly significant, that a rat which had been twice immersed in the mixture for half an hour without injury, was killed in two minutes by ether; and yet ether is far safer than chloroform.

"It is my impression that the best proportion of oxygen will be found to be one-fifth by volume, which is the same as in the atmospheric air. There are some points requiring care in the management, in order to insure success. As the oxygen dilutes the nitrous oxide, it is necessary to be very careful to exclude all atmospheric air, or else the anæsthesia will be imperfect. The inhaler must be taken into the mouth, the lips very carefully closed around it, and the nares compressed by the person administering the anæsthetic. For the same reason, great care should be taken to secure purity of the gases, otherwise the mixture will be too weak to control some patients. I have found, by introducing phosphorus into a bell-glass of what was supposed to be very pure nitrous oxide, that it contained considerable free oxygen, which doubtless was from included atmospheric air; and therefore four times the bulk of free, inert nitrogen must have been present also, to weaken the power of the article.

"The oxygen is best prepared by taking pure chlorate of potash mixed with a little black oxide of manganese, and placing them in a copper retort and applying heat. The gas should pass through four washing-bottles, just as the nitrous oxide does. The same bottles will answer. As the nitrous oxide is fifty per cent. heavier than oxygen, it is better to pass it into the gasometer first. The oxygen coming afterward, passes up through it, and hastens the mixing. It is better to let them stand a day or two, if possible, before using, to complete the mixture, but this is not essential. * * * *

"It seems probable, therefore, that the oxygen mixture will enable us to anæsthetize a patient for the longest as well as for the shortest surgical operations, and that it is safer and pleasanter than any anæsthetic known. There are, however, some inconveniences about it, on account of its great bulk. For office use, and also in hospitals, this is no objection, as it can be kept in a gasometer; but for outside patients it can only be carried in a large rubber bag."—(*Chicago Med. Examiner.*)

Nitrate of Amyle in Neuralgia.—J. DAVIES writes to the *Med. Investigator*, that, while on a visit to Sir James Simpson, he saw him adopt the following treatment in a case of *tic douloureux:* "Sir James took a piece of pasteboard, twisted it as for inhaling chloroform, and then dropped two drops of *nitrate of amyle*, and gave it to her to inhale. In three minutes, she was under its influence; and in three minutes more, she lost the *tic*. Thus, he stated, had he cured some of the worst of nervous pains—as sciatica, etc."

Septic Poisoning, without Local Lesion.—Upon this subject, Mr. Paget observes (*Lancet*): "It must have occurred to every one seeing many cases of syphilis to meet with patients having secondary or tertiary symptoms, who have nevertheless been unconscious of having ever suffered with primary disease. Such cases are commonly explained away or disbelieved. They may have been instances of infection through textures which were not observably contaminated by the transmission of the infecting material through them. Such a transmission is sometimes observed with the poison of dissections; and although one may doubt much of what some believe respecting the derivation of pus-cells from exuded white blood-cells, yet it is quite certain that pus-cells and

others like them may pass through membranes having no visible apertures, and may leave no visible traces of their passage."

"*Antiseptic Surgery.*—M. Maisonneuve, of Paris, contends that it is our own fault if the results of the great operations of surgery are not favorable. He summarizes his method as follows: 'Lifeless organic liquids are the only cause of the untoward state of wounds. The indications, therefore, are to prevent the death of the organic liquids, and to eliminate them when deprived of life. To fulfill the first indication we must prevent the prolonged contact of living fluids with dead organisms, be the latter solid, liquid, or gaseous. To fulfill the second, we should eliminate dead fluids by counter openings, irrigations, or drainage, but especially by continuous aspiration or sucking up, which last measure may advantageously replace all those above mentioned.' This aspiration is carried out by means of a bag connected with a tube.

"M. Jules Guérin contends that he is the author of this method, having all his life advocated subcutaneous surgery. He, however, does not, like M. Maisonneuve, pay attention to dead liquids; his object is to prevent complications by an apparatus either before or after the introduction of air, which he calls pneumatic occlusion.

"Such is the difference of views and practice between these two ingenious men, who, after having worked together in this field of inquiry in a friendly manner, are now engaged in rather bitter polemics.

"M. Maisonneuve states, now that his method is carried out among the patients at the Hôtel Dieu, that he does not see any fatal cases after amputations, compound fractures, etc. These favorable results naturally bring to mind the success which is nowadays attending Lister's method. The latter surgeon endeavors to prevent the admission of germs into wounds, and thus considers that no decomposition takes place. M. Maisonneuve prevents the death or decomposition of fluids by a sucking or aspiring apparatus; and M. Jules Guérin by pneumatic occlusion, as he calls it, *i.e.* atmospheric compression and exclusion of air. Maisonneuve and Guérin are not so generally imitated in France as Lister is in Britain. Let the three methods abide the best of trials, viz., the trial of time."—(*The Lancet.*)

Permanganate of Potash.—In the Report of Jacksonville Surgical Infirmary (*Chicago Medical Examiner*), it is stated that, "from comparative trials made with permanganate of potash and carbolic acid in erysipelas, putrefaction and complications of wounds, permanganate is believed to be greatly superior to carbolic acid, and to everything else which has been tried. It is applied over wounds, and upon erysipelatous surfaces in nearly a saturated solution. Over wounds it is best applied by laying on a portion of lint saturated with the solution. This is probably the best application to make to bullet wounds and those attendant upon compound fractures. By preventing the putrefactive change in the exudations and effusions, the extension into them of the organizing process is greatly favored. Care should be taken not to apply the solid salt, as it acts as a caustic."

Rickets, etc.—A writer in the *Med. Times and Gaz.* states that "in the modern inhabitants of Swanwich and their occupations the visitor will find plenty of interest. The shore is belted with heaps of hewn

stone, and the music of the chisel is heard from morning till night. Of course, stone quarries abound, from which the greater part of the paving-stone of London is extracted. Some of the Purbeck workmen, it is said, have attained great eminence as carvers of stone. Many of them are said to live on the truck system—*i.e.* to run in debt at shops for provisions, and square the account by stone. The men do not look robust, although easy labor in pure air should make them so; but all accounts speak of early intermarriages of cousins, of close apartments, of scrofula and phthisis, as concurrent facts. Although the water be as full of lime as possible, rickets and decayed teeth are very common, a fact worth the attention of those who believe a hard water to conduce to strength of the bony tissues."

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Hemorrhage after Extraction of Teeth.—T. M. P. writes to the *Lancet:* "A case of this kind occurred a short time ago, in which bleeding continued for six or seven hours, until it was stopped by the following treatment, the effect of which is immediate and permanent, and gives no pain. I have treated five cases in the same manner: soften a bit of white wax, and mould it into a conical shape about an inch long, and press it into the cavity, at first lightly, and then very firmly, so as to fill it. Cover this with a thick pad of lint, to retain it in its place, and bind the jaws together for a few hours with some kind of bandage."*

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Tooth in Upper Lip. North Staffordshire Infirmary. (Under the care of Mr. W. H. Folker.)—"Albert H——, aged sixteen, joiner, was admitted into the above infirmary, on August 29th, 1867, on account of a tumor existing in the substance of upper lip. The swelling was on the left of the median line, corresponding to the left central incisor tooth, and seemed to be formed of hypertrophied lip. It caused a good deal of deformity, as the patient was unable to accurately close his lips. The tumor felt hard, but was not painful. On carefully examining the swelling, a small aperture was perceived at its base; and, on passing a fine probe, a hard substance was felt, which was diagnosed to be a tooth.

"Aug. 31st.—An incision having been made through the tumor, a tooth was found at its base. On attempting to extract it by the forceps, it was fractured; this proved to be owing to its peculiar shape, being of a crescentic form, and passing almost at right angles to the alveolus. After its removal, the swelling disappeared, and the patient was discharged on the following day."—(*The Lancet.*)

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Reparation after Injuries of Face.—In a complimentary notice of Mr. Heath's "Prize Essay" on "Injuries and Diseases of the Jaws," the *Lancet* says: "Mr. Heath refers to the vascularity and active vitality of the face, in explanation of the rare occurrence of necrosis of splinters after injury; but he scarcely mentions a fact that we have had some opportunities of observing—namely, that these conditions are also singularly favorable to the restoration of the personal appearance after injury. We have seen an instance in a young subject, of a face smashed by the kick of a horse, and left without treatment until swelling rendered the application of apparatus impossible, but in which, nevertheless, after a dis-

* The addition of persulphate or perchloride of iron or other styptics would be useful.—Z.

torted union, the lapse of two or three years sufficed to remove almost entirely the external marks of disfigurement. It may be a consolation to surgeons in a difficulty to remember that there is perhaps no part of the body for which nature will do so much."

Artificial Replacement of a Portion of Lower Jaw and Tongue, and Restoration of Articulation. By GEO. H. PERINE, D.D.S.—"I herewith transmit to you an account of one of a series of remarkable cases which have occurred in my practice; and as time affords me opportunity I will prepare and forward to you reports of others.

"The dental surgeon is not now, as formerly, confined to the repair of decayed teeth, the substitution of artificial ones for those already lost, or the extraction of those so far gone that there remains no hope of their preservation. He is called upon to remedy malformations, and to supplement the work of the surgeon, by the substitution of dentures for parts which have been removed, involving oftentimes the palate, the superior and inferior maxillary bones, the tongue, and the bones of the nose. The resources of dentistry have been found equal to some very extraordinary demands, both for skill and invention. It has been my fortune to meet with a large number of cases beyond the ordinary routine of my brother practitioners, and it would perhaps be wrong for me to withhold the history of them from the profession.

"In February I was called upon by Mr. ——, aged forty-eight, of a bilious temperament, who several years previously had submitted to an operation for a disease of the inferior maxillary bone, which extended to and involved the left lateral portion of the tongue. The history of the case, and the precise character of the disease which necessitated the operation, were very imperfectly given by the patient, who had almost lost the power of utterance. Upon examination, I found the mouth in the following condition: a large portion of the left side of the tongue had been removed, and between the first lower bicuspid on the left and the wisdom tooth on the same side, the teeth were removed, and in their place remained a deep depression. On the opposite side of the jaw two bicuspids and one molar were gone. The surface of the tongue, where a portion had been cut away, had healed imperfectly, and there appeared to be a generally unhealthy state of the gums and the soft parts of the mouth. The breath was offensive, and the saliva was ropy. As might be expected, the general health of the patient had suffered, and he seemed anxious and worn.

"My treatment was, first, to correct the morbid condition of the tissues by the use of strong astringents. As soon as the state of the parts permitted, I proceeded to take casts of the mouth. * * *

"The entire alveolar process between the first bicuspid and the wisdom tooth had been removed, together with a part of the body of the bone; and a large portion of the tongue had also been amputated. The action of the muscles upon the remaining portion had drawn it back, so that speech was nearly impossible, and deglutition difficult. Nature had made some feeble attempts at restoration, but so far as I could determine, the cavity left by the removal of the process had been only very partially filled by a semi-cartilaginous tissue, so that a dissection of the parts would have shown the bone nearly as it appears in the drawing.

"I decided to repair this extended damage by a single denture, made of hard and soft rubber; the vulcanized rubber to sustain the artificial

teeth and form a basis for the attachment of the soft rubber, with which I designed to reconstruct the tongue. The hard rubber portion filled the cavity in the jaw, and passing around and resting against the inside of the remaining alveolar process, to the right side, rested upon the gums and formed a support for the artificial teeth to be supplied on that side; the portion fitting into the cavity on the left also forming a support for the artificial teeth on that side. I moulded a piece of soft rubber into the shape of the part of the tongue which had been cut away, and extended from its borders, on the right, a thin rubber membrane, forming a sack which could be slipped over and closely fitted to the remaining portion of the tongue, like a glove finger. To the posterior lower border of this portion I attached a ligament of soft rubber, and extended and attached it to the arch or plate of hard rubber above described, so that it drew equally in all directions, and covered the soft parts beneath the tongue. Finally, the hard rubber plate was attached by clasps to the dens sapientis and the first bicuspid on the left, and the second molar and first bicuspid on the right.

"This denture far more than exceeded my most sanguine expectations. The patient was enabled to speak with ease, and masticate almost any kind of food. The distortion of his face previous to its introduction was remedied, and his general health much improved."—(*Medical Gazette.*)

Artificial Horn and Coral.—The Druggists' Circular states that "Chemistry has discovered a new and interesting use for potatoes, and other vegetables, illustrations of which were seen by visitors at the Paris International Exhibition. If potatoes are peeled, macerated for about 36 hours in water, to which 8 per cent. of sulphuric acid has been added, well washed with water, dried in blotting paper, and then in hot sand, for several days, on plates of chalk, or plaster of Paris, which are changed daily, being compressed at the same time, an excellent imitation of meerschaum, answering well for the carver, or any purpose, not requiring a high temperature, will be obtained. Greater hardness, whiteness, and elasticity will be produced if water, containing 3 per cent. of soda, instead of 8 per cent. of sulphuric acid, is used; and if, after the potatoes have been macerated in this solution (soda), they are boiled in a solution containing 19 per cent. soda, a substance resembling stag's horn, and which may be used for knife-handles, etc., will be formed. Turnips may be used instead of potatoes, in the production of the artificial horn; and, if carrots are substituted for potatoes, a very excellent artificial coral will be presented."

"*Artificial Stone; the Process of its Manufacture.*—This remarkable and important manufacture is at last not only well established on chemical principles, but carried out on a large commercial scale. Nearly a quarter of a century has elapsed since Mr. Ransome, of London, commenced his experiments in this direction. For years the concrete stone has been subjected to every test that ingenuity could devise—to heat and frost—to water, fresh, salt, and impure, to wash and attrition, and to every atmospheric exposure. Very few natural stones are as durable or as uniform, and the best of them are costly, and, in many localities, inaccessible.

"But the comparative cheapness and durability of the artificial stone

are of no greater importance to architecture as an engineering art than to architecture as a fine art. The enormous expense of cutting shapeless rocks into the exact and elaborate forms of beauty, prevents the general adornment of structures. But when the beautiful form may not only be *cast in a mould*, but endlessly reproduced from the same mould as easily as the ugly form; and when the most florid ornamentation may be more cheaply moulded than the plainest and most unrelieved outlines can be cut, there will be no further excuse for the monotonous, ugly, or cheap-looking buildings that characterize street architecture, especially among the Anglo-Saxon peoples.

"Those who have occasion to study in detail, or to practice the new art, should read the various illustrated and technical articles upon it in the London *Engineering*. The general features of the process are as follows: we quote from the New York *Times*, which presents a résumé of the subject.

"'Mr. Ransome's patent concrete stone consists of sand united, not by any mechanical sticking compound, but by chemicals which transform it into a new and homogeneous mass. It is particles of sand, in some cases mixed with a little limestone, united by silicate of lime. The manner of forming this silicate of lime in the mass is, in fact, the essence of the invention. The sand is mixed with a viscid solution of silicate of soda, which produces a pasty mass, readily moulded. When the required forms are produced they are treated with a solution of chloride of calcium, when the silicic acid and the oxygen of the silicate of soda combine with the calcium of the chloride of calcium and form silicate of lime, while the chlorine of the chloride of calcium unites with the sodium and forms chloride of sodium (common salt), which is afterward washed out. But Mr. Ransome had no sooner discovered *how* to provide for the chemical reactions than the commercial problem of cost of materials assumed very serious proportions. Silicate of soda, the chemical upon which the process hinges, was, indeed, produced by two modes, both of them, however, expensive, and neither of them adequate in degree. The solution was too weak to answer his purpose. The scientific importance and the practical difficulty of the improvement, therefore, lay—just as they did in the Bessemer and other processes—not in making the desired material, but in making a material with which to make it. Mr. Ransome's great invention was the production of silicate of soda under pressure. While powdered flint-stone, boiled in a solution of caustic soda, at the atmospheric pressure for many hours, would yield but a weak and inadequate fluid, whole flints so boiled, under a pressure of sixty pounds, readily dissolved and formed a strong silicate of soda.'"—(*Scientific American.*)

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"*Mortar: Dr. Artus' Method.*—It is well known that with modern mortar the formation of silicates does not take place until after a long time, and then only in a very slight measure. But it is just these silicates which give mortar firmness, and at the same time make it capable of resisting the action of water. It is to the formation of such silicates that cement owes its hardness and imperviousness to water. Lately, Prof. Artus discovered a method of preparing mortar by which the silicious earth is, according to the chemical term, set free, and the formation of silicates greatly promoted. The mortar prepared after this method hardens much more rapidly than common mortar, attains equal

hardness with cement, and forms no tears while drying. It may also be accepted that it can be used under water in the place of cement. Still, until now, only experiments in which the Artus mortar has proved its excellence as air mortar have been reported to us, while of its utility in the place of cement under water no confirmatory experiments have as yet been made known to us.

"The method employed by Dr. Artus is extremely simple. Take well slacked lime, and mix carefully with it finely sifted sand; when this has been done let there yet be added one-quarter as much fine unslacked lime as there has been sand used, and mix thoroughly. While it is being mixed the mass heats and the mortar may then be immediately used. Of course the unslacked lime must not be added to the mass until it is wanted for use. During the heating of the mass silicates form through which it quickly stiffens and becomes very hard in a short time. This mortar forms no tears. It resists all action of the water, and can therefore be used whenever durability is an object. This mortar clings so firmly that after a short time even considerable force has to be used to separate it from the building material. Experiments made with it have yielded brilliant results, so that the writer may believe to have solved the former so-called mortar secret. This is what Dr. Artus writes in his quarterly periodical. An experiment known to us yielded the following result: one part of well-slacked lime was carefully mixed with three parts of fine sand, and just before using, three-quarter part of fine unslacked lime was added, and the whole then thoroughly mixed. The mortar thus prepared was used in building a foundation wall, and after four days became so hard that a pointed iron could not be driven into it; it clung with equal tenaciousness to the stones of the wall. After two months the mortar was just as hard as stone."—(*Iron Age* and *Scientific American.*)

Wood Rendered Incombustible.—"The process, originally patented by Dr. Wilde, but now public property, consists in saturating the wood with a very dilute solution of the silicate of potash, as neutral as possible, and, when dry, varnishing, once or twice, with a more concentrated solution. By this simple process, we can render our doors, staircases, and other wood-work, perfectly fire-proof. The process is in common use in Germany."—(*Boston Journal of Chemistry.*)

"*Platinum Coating for Copper and Brass.*—Bottger gives a process for getting a bright coating of platinum on brass, copper, and other metals, which does not look to us altogether new; but, as some of the directions seem novel, we may quote them. He first makes a nearly neutral solution of chloride of platinum, by carefully adding carbonate of soda to the acid solution, as long as there is effervescence. To this solution he adds a little glucose and some chloride of sodium, without which latter the platinum would be deposited black. The articles to be coated have only to be immersed in this mixture; but, when it is wished to coat a number of small objects—pins, for example—it is recommended to place them in a sort of zinc sieve, and immerse the whole in a solution, heated to about 160 degrees Fahr. The coating of platinum is deposited almost instantaneously, and the articles have then only to be well washed and dried in warm sawdust."—(*American Artisan.*)

"*India-rubber Sponge.*—One of the most ingenious and useful applications of india-rubber which we have seen, for a long time, has been forwarded to us. It consists of a highly porous, cellular mass of vulcanized india-rubber. The material is, at present, only supplied in oblong, rectangular tablets, stiffened at the back by a plate of solid india-rubber. This renders it more effective for cleaning paint, windows, etc., but somewhat detracts from its use as a substitute for a bath sponge. If the makers would supply the material in oval tablets or larger masses, without any solid stiffening, it would form a most perfect imitation of sponge, and would have the great advantage of being almost indestructible. It can be used either with or without soap."—(*The Chemical News.*)

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Indianite.—*The American Artisan* says: "A new cement, under this name, was lately presented to the Polytechnic Association of the American Institute, consisting of 100 parts of india-rubber, 15 parts of resin, and 10 of shellac. It becomes hard in a very short time, and is made liquid by the addition of bisulphide of carbon. This item caused some discussion. Dr. Parmelee did not believe it had the virtues claimed for it. He thought it would be better to dissolve it, by means of naphtha, instead of bisulphide of carbon, which is very objectionable, on account of its odor."

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Cement.—The editor of the *Scientific American* says: "The best cement we know of for general use is made as follows: isinglass, 2 drachms; soak 24 hours in 2 ounces of pure water; boil it down half, add 1 ounce of rectified spirit, and while it is hot strain through linen. Next melt 1 drachm of mastic and ½ drachm of gum ammoniac in 1 ounce of rectified spirit; add the latter solution to the first and mix thoroughly. This may be used for joining almost anything that is broken, but is too expensive to be used as a substitute for glue where the latter will do as well. In cementing, warm the edges of the articles to be joined, and spread the cement over as thinly as will cover the entire surface. Most people use too much."

BIBLIOGRAPHICAL.

Injuries and Diseases of the Jaws. The Jacksonian Prize Essay of the Royal College of Surgeons of England, 1867. By CHRISTOPHER HEATH, F.R.C.S., Assistant Surgeon to University College Hospital, and Teacher of Operative Surgery in University College, London, etc. With numerous wood engravings. London: JOHN CHURCHILL & SONS. 1868.

This work is of the highest practical value. It treats of dislocations, fractures, deformities, and other disorders of the jaws, with the means for relief, illustrated by drawings of displacements, apparatus, morbid growths, portraits of patients, etc., to the number of 154. It embodies American as well as European experience, and contains quite a large appendix of cases in detail. The practical character of its contents, with good paper, print, and engravings, strongly commend this book to the profession. Every surgeon and dentist should have a copy.